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92WS0121B Duesseldorf WIRTSCHAFTSWOCHE in German 20 Nov 92 pp 103-109

[Text]

Technology Transfer

A Shot With the Laser

After a Late Start, Bochum's Development Center Wants to Sparkle With Quality

Five years ago, Thomas Papenbrock made a lucky shot, academically speaking. At the time, the chemist was working on a basic research project at the Ruhr-Universitaet Bochum and was bombarding nitrogen compounds with laser light. "In the process, we suddenly discovered light signals which we had not expected," recalls Papenbrock.

He really wouldn't have had to pay any more attention to the signals, since it had nothing to do with his research project. But the phenomenon bothered him. Papenbrock got to the bottom of the matter on his own. And so, after several years of work, a measuring device was produced, the only one of its kind in the world, which can detect tiny traces of nitrogen compounds such as nitric acid (HNO_3), ammonia (NH_3), or ammonium nitrate (NH_4NO_3) within seconds. Papenbrock now wants to market this device; he founded LaserChem.

The young entrepreneur is hoping for sales among the many air measurement authorities. He can offer his help to mobile measuring stations as well. And LaserChem may also be used for more precise detection of air pollutants which lead to forest decline. The forest-destroying substance nitric acid results from the combination of nitrogen compounds with water. These compounds get into the air when, for example, natural or synthetic fertilizers are applied.

For the analysis, air is sucked into a measuring cell and bombarded with high-energy light from an argon fluoride laser. The molecules of air and the pollutants which it contains are broken down and excited energetically. As they return to the normal state they emit light, which is recorded in photocells. The wavelengths of the emitted light differ depending on the pollutant.

LaserChem is a showpiece of the recently opened Development Center at Ruhr University Bochum (EZR). "We do not want to leave the economic success of such discoveries to chance," says Udo Schmidt, director of EZR's sponsoring association CHIP [Cooperative Society for Universities and Industrial Practice Ltd]. CHIP wants to pass on commercial expertise to young people trained in science and technology. "With us," says Schmidt, "the engineers learn their first steps as entrepreneurs."

To this end, CHIP offers them attractive start-up financing, charge an affordable rent, and allows office and meeting facilities to be used at cost. Thus the leap from the university to the boss's chair is much easier than it would be without a net and double bottom. In addition there are a variety of connections, contacts, and experiences which the technology center can fall back on—large firms such as GEA Energietechnik, Krupp, Opel and Thyssen as well as small and medium-sized businesses like the Josef Eich engineering firm belong to the EZR sponsoring association.

"We don't want to leave the economic success of discoveries to chance."

Fifteen companies with 150 employees have already seized their opportunity in Bochum. Schmidt estimates that the final capacity of the EZR will be 25 to 30 businesses. The vast majority of them are pure subsistence establishments and come from all fields. They range from biotechnology and microelectronics to medical and environmental technology to laboratories for the development of components for computer integrated manufacturing (CIM).

Among the businesses which Schmidt is especially happy to present is Ekkehard Hostert's Oxytech—together with the Universitaet Bonn—has developed a new method for water analysis, the so-called protoplast test.

Since he introduced his idea to the experts at the last Biotechnika in Hanover, inquiries from all over the world have been pouring in. "We still need over half a year before the test is ready to go into production," says the self-made man, who taught himself biotechnology after his studies for the teaching profession were interrupted.

In view of the power of the protoplast test, the enormous interest is not surprising. Cultured, wall-less cells of the broad bean, so-called protoplasts, serve as an extremely sensitive living detector for weed killers (herbicides) in the water. The higher the level of pollution, the more the growth of the protoplasts is inhibited—with the consequence that they produce less oxygen. This change, a measure of pollution, is recorded with the aid of a sensor.

This test means a quantum leap for water analysis because traditional wet-chemical methods are more expensive and cannot be automated. "As a rule, the fish are floating belly up before the water analysis is finished," says Hostert. In contrast, his biological analyzer, which only needs to be serviced on a weekly basis, spits out measurement results every half hour, so that even small changes in water quality can be noticed immediately and appropriate countermeasures can be taken quickly. Furthermore, the costs are considerably lower than with conventional analyses, for example, with very expensive gas chromatographs.

If Schmidt is proud of having attracted a number of promising candidates into the EZR in a short time, the idea of technology, development, or innovation centers

is by no means new. The widely successful concept dates from the start of the 1980s. The seeds for high-tech enterprises should give established industry in the vicinity new impetus (see box). Erhard Schelzke, board member of the Association of German Technology Centers (ADT), estimates that there are more than 100 such centers in Germany. Bochum is among the latecomers.

According to Schmidt, the North Rhine-Westphalian government in Duesseldorf is to blame for this. For 20 years, they let two unused university buildings deteriorate. With 55 million German marks [DM] from the EC, federal and state governments, Bochum's eyesore was finally renovated to become the engine of the region's innovation.

The Bochum group wants to make up for the delay by demanding high quality. In addition, Schmidt has set a second ambitious goal for himself. "Not a single enterprise should go bust with us," says the former management consultant.

The criteria used to seek out would-be captains of industry are correspondingly tough. Schmidt demands "a conclusive concept with business plan and market research."

And if, as expected, affairs flourish and return on investment begins, then the young entrepreneurs must leave the EZR. "We don't want to have anyone here longer than three to five years," says Schmidt. "After all, the next generation wants to find a place here, too," says the CHIP manager.

At least one enterprise is ready to move on. The Development and Research Center for Microtherapy (EFMT). The firm was sponsored with a grant of over DM20 million from Duesseldorf's state government, a controversial payment which finally led to problems for North Rhine-Westphalian Labor Minister Hermann Heinemann.

The EFMT develops operative techniques for so-called minimal invasive surgery, which are easier on the patients. Tiny, remote-controlled instruments are brought to the operation site in the human body via endoscope—either through natural body orifices or through very small incisions.

Micram Microelektronik GmbH, another pearl, will soon be able to get along without EZR protection, too. The firm, which came directly from the university, develops superfast chips for data transmission as part of research projects and on contract for industrial customers.

The newcomer, founded by Matthias Frei, managed to set a world record with the latest so-called demultiplexer; with a transmission rate of 12.5 billion bits per second, it can process almost 130,000 digital telephone conversations simultaneously.

This heralds the economic breakthrough. Because the right software instruments for chip development are lacking, Micram specialists developed their tools themselves using so-called object-oriented programming—with such success that a U.S. software manufacturer has now named the newcomer as sole distributor for its database systems. "We finally have a product which we can use to sell what we have developed," says Frei happily.

The blossoming success story of the software developer began with a defeat. The champion of object-oriented programming, which will revolutionize software use in the coming years, would have liked to pursue a university career. After finishing his studies, Frei applied for a teaching position at the university in Bochum. He wanted to acquaint the students with progressive programming techniques. Fearful of being quickly overshadowed by a youngster, the professors rejected the idea.

Nevertheless, the professors' rejection turned out to be lucky for Frei: "I just decided to put all my efforts into my own company."

Second Wave of Start-Ups [Box]

Almost 100 innovation centers with a good 2000 firms in which more than 20,000 jobs have been created already exist in the old German states. Nevertheless, the wave of start-ups is unbroken. Established facilities are being expanded, and within their sphere of influence, often in neighboring towns, new ones are developing.

However, it is the new German states which are reporting the greatest boom. The number of technology centers there will exceed 35 over the course of the next few years, estimates the Association of German Technology and Innovation Centers. At present there are 14 such facilities with 225 firms and 1000 jobs.

The innovation park in Berlin-Koepenick is by far the largest. One hundred firms have already established themselves there. However, as the Berlin engineering magazine "Ing.-Digest" observes critically, "only 37 can actually claim to be small, technology-oriented start-up enterprises." This criticism applies to other centers as well.

The centers were and are financed—at least in the beginning—by the federal government, states, and municipalities, and occasionally by local industry as well as banks and thrifts.

Yet with time, many of these institutions grow into commercial businesses which can finance themselves exclusively from rental income and services, as a study of the German Treuhand (Trust Agency) group illustrates. It is also shown that successful new enterprises leave the sheltering center after a certain time in order to establish themselves elsewhere, often in nearby technology parks such as those in Cologne and Dortmund. These parks, which charge rents sufficient to cover costs, also act like magnets on established firms willing to be inspired by the innovative drive of the young entrepreneurs.

Romania: Statistical Study on Research Activity Reviewed

93P60126 Bucharest ROMANIA LIBERA in Romanian 14 Jan 93 p 4

[Text] During the first semester of 1992, 158 of a total of existing research organizations in Romania were the subject of a statistical investigation. The results were as follows:

—The 158 institutions employed 37,813 persons. Of these, 17,000 were university graduates, including 1,269 PhDs in science and 1,286 PhD candidates. We must mention that the rest of the personnel is made up of laborers, technicians and foremen.

—Of the 17,000 researchers, only 1,143 went to diverse forms of special training, and of these only 221 did this training abroad. The training never exceeded five months. The conclusions drawn from these numbers place our research in a precarious position. The 17,000 researchers have access to only 1,288 foreign publications, and 203 benefited from exchange programs with foreign laboratories.

—The research at these facilities falls into the following areas: first of all is design and engineering technology; second, ecology and environmental protection; and third, computer science, chemistry and agricultural science. What this means is that the research fields were selected well, and that they express our real needs. Of the 158 research institutes, 130 provide technical-economic assistance to their beneficiaries. The results of this scientific research are not yet known; their exact evaluation is impossible and requires longer periods of time. The amounts of money allocated in the budget are too small for research activity to survive, under normal conditions, if a new organizing formula is not found. Scientific research is necessary and profitable—a fact which was demonstrated also by the investigation undertaken by the National Commission for Statistics.

Bavaria's Program To Promote Technology Viewed

93P60135 Duesseldorf HANDELSBLATT in German 28 Jan 93 p 20

[Text] Bavaria's technology support is aimed mainly at strengthening the innovations of medium and small businesses. Nowadays more than 20,000, or one of three medium and small enterprises in the FRG, carry out research and development, stressed Bavaria's Minister of Economics, August R. Lang.

Small and medium companies in Bavaria spend more than DM1 billion every year for research and development. With this technology applications program, Lang is offering a new, third variation of Bavarian technology support for small and medium businesses.

Since 1980 the Bavarian innovation promotion program has provided more than 200 companies with DM94 million to develop projects from the ideas to the prototype. The subsequent technology introduction program supports the development of prototypes up to the serial production of new products and processes. This second program has provided 162 enterprises with a total of DM140 million. However, in the view of the economic minister, these two programs are unsuitable for the skilled trades.

Therefore, the new technology application program is aimed particularly at companies in the skilled trades and small industries with no more than 250 employees. Until now, only their own developments could be supported. But medium and small enterprises are often forced to purchase new technologies because they lack the resources to develop them themselves, Lang said.

This new support program is to include investments in such things as new machines and building equipment. But it will also support the implementing costs, thus the personnel training and construction and development expenses which are necessary to get the machines operating. There are no limitations as to the technological purposes or the buyers, he said. In view of the wide range of skilled trades and industries, Lang feels it is necessary to offer an applications program which does not favor any branch and which includes all important technologies.

At the beginning, this program will comprise DM40 million. This money is to support roughly 200 projects annually by loans with favorable interest rates. The economics minister has set the goal of 800 to 1000 supported projects with an annual amount of DM150-200 million. The subsidy rate for loans is 7.5 percent for investments and 15 percent for personnel and training costs. This broad technology applications program is also supposed to represent a replacement for the cutback in regional subsidies.

France: Materials Policy Council Formed

93WS0184B Paris PRODUCTIQUE/AFFAIRES in French 10 Dec 92 p 3

[Article: "COMAT: First Materials Policy Council"]

[Text] On 3 November, Hubert Curien opened the first Materials Policy Council [COMAT] and a Materials Interministerial Group [GIM]. The purpose of COMAT is to draw up recommendations on the national policy in regard to research and development and to materials technologies, and to influence operating strategies. This Policy Council will also contribute to the identification and enhancement of the strengths in the French offering of materials with a potential for development within a context of international competition dominated by the United States and Japan, with a view to limiting, to the extent possible, the risks of dependency. COMAT consists of 15 professionals appointed by decision of three

ministers: the ministers of industry and foreign trade, research and space, and defense.

The GIM, for its part, is made up of government professionals. Its function is to implement the actions decided by the governmental authorities together with COMAT.

By these actions, the government intends to strengthen materials supply policy. Special emphasis is to be placed on improving the flow of information to enterprises that are users of materials; on the training of personnel; and on putting in place an efficient organization to facilitate technology transfers, the bringing together of users and producers of materials, and the sharing of risks.

BRITE/EURAM II Approves New Projects

93WS0184D Paris PRODUCTIQUE/AFFAIRES in French 10 Dec 92 pp 5, 6

[Article: "BRITE/EURAM: 16 Projects Approved Under CRAFT and 33 Feasibility Awards"]

[Text] The European Commission has approved 16 CRAFT cooperative research projects for Community contributions under the BRITE/EURAM support program. In addition, the Commission will contribute to 33 feasibility awards in the field of industrial technologies and materials (BRITE-EURAM 2).

A call for CRAFT cooperative research proposals for a duration of two years was published in the JOURNAL OFFICIEL of 24 December 1991. Pursuant to this call, the Commission received 65 proposals, 16 of which were approved by DG XII [General Directorate 12]. The 1992 appropriations necessary to cover these 16 projects total ECU5.8 million.

Feasibility awards have also been granted to the PMEs [Small and Medium-Sized Businesses] to assist them in entering the program. An open call for proposals was published in the JOURNAL OFFICIEL of 24 December 1991, in response to which the Commission received and evaluated 56 proposals for feasibility awards. It approved 26, necessitating the appropriation of ECU757,650. A DG XII evaluation of a second round of 90 eligible feasibility proposals out of 107 received as of 25 June 1992 yielded 33 approved projects, necessitating appropriations totaling ECU960,595.

CDU Politicians On Significance, Needs of High Technology

93WS0187A Duesseldorf HANDELSBLATT in German 24 Dec 92 p 3

[Article by Hans Jorg Sottorf: "Consensus on the Significance of High Technology as the Heart of the Economy Lacking"]

[Text]

High Technologies/Conversation With the Deputy Chairman of the CDU/CSU Bundestag Party, Michael Glos, and the Research Policy Spokesman, Christian Lenzer

The deputy chairman of the CDU/CSU Bundestag party, Michael Glos, and the research policy spokesman, Christian Lenzer, have demanded a clear political declaration of loyalty to the future-oriented technologies. In an interview with HANDELSBLATT, the two Union politicians advocate an improvement in the research climate in Germany.

Glos and Lenzer complain that, in Germany, "The atmosphere for innovation has been lost." Policy and the economy should work together for improved acceptance by the population. A lot would already be accomplished if a consensus could be reached in policy, the economy, and society regarding the necessary preeminence of high technology as a prerequisite for the international competitiveness of the German economy.

Glos and Lenzer raise their demands mainly with respect to genetic engineering. They characterize this as another key technology of the future. While this technology has long been seen as a matter of course in public opinion in the U.S. and Japan, research and production facilities in Germany are in the center of critical discussions. Comparatively strict legal conditions dominate and legal licensing procedures last considerably longer than customary internationally. "This considerably decreases the chances of German companies in this international growth market," emphasize Glos and Lenzer.

It is indeed true that the Federal Republic holds third place internationally after the U.S. and Japan in biotechnology research measured by the number of patents. Industrial exploitation of research results, on the other hand, develops much too slowly. German industry is only building genetic-engineering research and production facilities in foreign countries. Foreign companies and institutes are not building genetic engineering facilities in Germany.

Young Talent Would Rather Experiment in Foreign Countries

"It is part of everyday life of the scientific young talent in the Federal Republic to perform genetic engineering experiments just over the French border in a friendly laboratory instead of squandering their strength in the myriad of bureaucratic hurdles in Germany," complain the two Union politicians.

To assure Germany as a location for research and technology, they estimate that a quick amendment to the genetic engineering law is needed. On the initiative of the CDU/CSU Bundestag party, the Bundestag called upon the government to prepare an amendment to the law by the end of January or the beginning of February 1993. One goal of the change in the law is to dramatically simplify the forms process and to introduce procedure

simplifications in the lower safety stages. This is primarily important for the lowest safety stage where 80 percent of all genetic engineering work takes place.

Beyond genetic engineering, Glos and Lenzer also point out that it will depend on the German economy not falling behind in the technologies in international competition that may be the basis for advances in many other areas of science and technology in the coming years. Information technology has become one of the largest economic branches worldwide in the meantime. This includes microelectronics, telecommunications, data processing and automation technology.

These areas will be formed by an above-average growth dynamic in the future also and will be important motive powers for other branches. Glos and Lenzer emphasize energetically that one German mark [DM] of revenue in information technology results in DM7-8 of revenue in other branches of the economy, for example, in the automobile industry, in machine and system construction. About one-third of the German gross national product comes from products having a microelectronic core.

Another thought is that, at this time, only one-fifth of the technological and economic potential of microelectronics has been exploited. Thus, four-fifths of the market has not been opened or utilized at all.

In the production of high-performance chips, Germany and Europe lag behind Japan and the U.S., state the two Union politicians. An important factor for this, in their opinion, is a "certain subcritical mass" of most European microelectronics manufacturers. In the 4-megabit chip, DM1.5 billion were needed for research and development purposes and for fabrication and test investment. For the 64-megabit memory, more than DM3 billion must be expected. This often exceeds the financial means of the companies. Added to this is a drastic drop in prices. Whereas in 1975, one transistor function cost DM1, it now costs "a few thousandths of a pfennig."

Teaching and Research Must Match

To ensure the competitiveness of German and European information technology industries, it is necessary, in the opinion of Glos and Lenzer, to increase the presence of this industry branch in the high-growth Asian area, to form joint ventures with foreign companies and to search more intensively for cooperation with Japanese companies. As an example, they point to the alliance of Siemens with IBM and Toshiba for the development of the 256-megabit chip.

There will continue to be a need for support of high technology by targeted basic research and applied research with early involvement of potential users. The two Union politicians demand, "Instead of parallel research work in different institutions and companies, cooperation between government research facilities and the economy must be improved so that the conversion to market of the knowledge obtained can occur smoother than before."

The future of Germany as a research and technology location will depend decisively, in the opinion of Glos and Lenzer, on what happens at the schools and institutes of technology in Germany as the "producers of qualified human assets." The shifting of economic value creation to areas of higher and higher value is placing more and more requirements on the qualifications of workers. The educational system in Germany must, for this reason, meet the technological and economic challenges to a greater degree than in the past. For example, it is necessary to streamline the educational plans at the schools and universities to align them to a greater degree to the requirements of the economy, believe the two Union politicians. They are preparing a hearing of the CDU/CSU party on the topic of high technology for the beginning of the new year.

France: Research Tax Credit 10-Year Results Analyzed

93WS0198A Paris INDUSTRIES ET TECHNIQUES in French 4 Dec 92 pp 11-12

[Article by Bruno Belouis, attorney with Cor-Belouis & Associates: "The Pitfalls of the Research Tax Credit"; first paragraph is INDUSTRIES ET TECHNIQUES introduction]

[Text] How to be sure that your "experimental development work" was conducted to substantially improve a product or process, and that your innovation did not result "from simply using the state of existing techniques."

The research tax credit (RTC) will soon be 10 years old, but it may be getting increasingly bad press. The fiscal incentive created by the 1983 appropriations bill involves about 4 billion French francs [Fr] a year, making it a hefty direct subsidy for the expansion of scientific and technical research. But what the state gives with one hand—that of the Research Ministry, which promotes the RTC—it can take away with another. Indeed, the tax authorities have their own peculiar, and somewhat archaic, view of research and have already filed many accounting adjustments—over 300 in 1991 among computer service and engineering firms alone—for misuse of the RTC. Moreover, fiscal law experts expect to see tax inspectors investigate other areas, particularly audiovisual production and engineering and design departments, thoroughly.

The 1993 draft appropriations bill calls for the RTC to be extended through 1993-95. But a whopping modification—not at all to the liking of company heads—is expected to go into effect retroactively from 1 January 1992. The mechanism of the RTC remains simple: Any company that increases its R&D spending from one year to the next is entitled to a tax credit for 50 percent of the additional outlay. The credit may be capped at Fr40

million—in other words, a company would have to raise its R&D spending by Fr80 million during the year to reach the maximum—but that is more than sufficient to interest most companies, especially those just starting an R&D program. A small or medium-size company starting out with an initial budget of Fr500,000 would receive a credit of about Fr250,000. Until now, that credit was deducted from the income tax the company owed for the following year. If that amount was "insufficient" (for instance, only Fr100,000 in the above example), the difference was immediately reimbursed by the state Treasury, which would write a check for Fr150,000 to the company! This is the provision that is slated to change: Henceforth, the credit will be deducted from company taxes for the year in which the expenditure was made and for the three following years. The new timetable sharply deflates the RTC's value to companies, while giving tax authorities much greater latitude in monitoring the propriety of claims and combatting fraud. Immediate deduction of the RTC—and thus its possible reimbursement—will now apply only to companies which the tax authorities themselves deem "new" (article 44 provision of the General Tax Law) and which are wholly or partly exempted from corporate income tax for five years. But the amendment will only shift the locus of the dispute, for defining what constitutes a "new company" raises huge problems of interpretation.

Why are tax authorities so suspicious of the RTC? The answer: A few short years after its creation, they were dumbfounded to discover that laboratories were canvassing companies to "sell them some RTC," the way one would market a good stock investment. In return, the labs pocketed a commission that was reckoned by the amount of taxes the company saved. The laboratories' proposition was enticing: Companies contacted did not pay any commission until after they had benefited from the tax credit deduction or been reimbursed for their taxes by the state Treasury! Canvassing was especially effective among software houses, where many companies conducted research without realizing it. Hence the alarm of the tax agents, who see research only where there are men in white coats and laboratories overflowing with test tubes and measurement equipment! Some abuses surely did take place among the whole lot of companies that benefited from the RTC. But what the disputes, which have been stacking up for several years, show more than anything else is that the laws defining which expenditures are eligible for research tax credits are extremely vague. Where there is vagueness, there is insecurity: A company acting in good faith can end up having its declared RTC-expenditures disputed, and thus be subjected to a tax adjustment.

Communication between tax authorities and the research world is difficult. The 17 October 1983 order defining how the RTC would be implemented, for instance, described basic research as follows: "Activities which, in order to contribute theoretically or experimentally to the solution of technical problems, lead to an analysis of physical and natural properties, structures, and phenomena, so that the facts which emerge from this analysis can be organized using explanatory models or interpretive theories." An explanatory model is a (generally graphic) representation of a physical or chemical phenomenon that can be classified! Applied research is defined in a similar fashion, as is the experimental development work that leads to the production of new materials, devices, products, processes, systems, and services, or to their significant improvement. Improvement is limited to modifications that are not the result of simply using the state of existing techniques! This last "state" is also defined, as "any knowledge that was available when the R&D work was performed, and its use by a skilled member of the profession (...) without any need for invention..."

Needless to say, such sentences have bewildered more than one jurist or tax inspector responsible for monitoring the RTC. And in the tax department, perplexity often leads to taxation: that is, in the case in point, to the issuing of a tax adjustment notification requiring the addressee to pay back the sums granted through the RTC! Furthermore, the reason cited for these adjustments is nearly always formulated in the same way. The inspector who conducted the audit, incapable of making a real scientific or technical analysis, kicks the ball off the field and writes, "Since the work involves only an economic risk, and does not entail any technical ones, and since its primary objective is to find market outlets and improve the productivity or profitability of a partially established product or process, it does not fall within the scope of research." This is probably a far cry from what the Ministry of Research originally had in mind, but a company receiving such a notice has already been ushered into the world of tax litigation....

Boxed Material: True and False Research Expenditures

Tax authorities have an easier time accepting the eligibility of research and development spending for an RTC when the outlay is clearly isolated on the books. An ideal situation that goes over very well is spending by a specialized subsidiary that performs research and development for a parent company. Likewise, invoices issued by a research company under contract match the spirit, if not the letter, of the law.

Aside from these somewhat special cases, a company that wants to benefit from the RTC can incorporate the following expenditures into its calculations:

—Tax-deductible depreciation allowances for fixed assets (buildings, equipments, installations, and so on) that are employed directly and specifically to perform technical and scientific research in France;

—Personnel costs for researchers and technicians directly involved in the above research;

—An amount equivalent to 75 percent of the above personnel costs for complementary operational expenditures;

—The cost of taking out and maintaining patents in France and abroad;

—Tax-deductible depreciation allowances for patents acquired to conduct new research.

In addition, these expenditures must apply to areas that tax authorities believe constitute true research.

Here are a few examples of eligible and ineligible expenditures.

Ineligible Expenditures

—The cost of developing engineering tools for series production.

—Research spending to adapt products to changes in fashion.

—Market and cost studies.

—The gathering of general data.

—Engineering projects researched using existing techniques.

—The adaptation of an existing software program or package to meet the specific needs of a customer or special user category (accounting, treasury- or stock-management programs, etc.).

—The development of a message-service computer program on a remote server.

—The writing of a classic two- or three-dimensional CAD program for desktop computers.

—The writing of a relational database software program.

Eligible Expenditures

—In the medical field: the determination of a chain of amino acids in an antibody molecule.

—In the automobile industry: research on the optimal penetration of volumes in the air; development of the shapes adapted for ideal penetration; the fabrication of a vehicle prototype based on the shapes developed.

—In the heating industry: research work on thermodynamic principles; the use of these principles for a specific application by varying experimental conditions; the development of a heat-pump model.

—In software design: the creation of a natural-language software factory; the development of an expert-system generator to interpret biomedical images; the study and fabrication of an integrated tool to check communication protocols; the design of numerical simulation software; developments associated with the introduction of high-speed telecommunication services; and the mastery of very big computer-communications networks.

Boxed Material: Summary

1. Starting in 1993 and taking effect retroactively in 1992, one year's research tax credit will be deducted from taxes due over the next three years.

2. As far as tax authorities are concerned, research that does not involve men in white coats, test tubes, and measurement apparatus is not research.

3. Engineering and design departments that claim the RTC may be the next in line for a thorough investigation by tax authorities, who started with software houses.

France: CNRS Performance Record Analyzed

93WS0198B Paris INDUSTRIES ET TECHNIQUES in French 4 Dec 92 pp 16-21

[Article by Michel Le Toullec and Valerie Borde: "How to Use the CNRS"; first paragraph is INDUSTRIES ET TECHNIQUES introduction]

[Text] The possibilities are highly varied, and not necessarily expensive or reserved for big companies. But firms must travel a long stretch alone—the CNRS is not much of a salesman yet.

Summary

—CRITTS or technical centers can "scare up" companies who need collaborators and direct them to the CNRS.

—CRIN clubs, where public and industry researchers meet, are proving highly effective.

—The confidentialty of research and the question of who owns the results are still the trickiest part of CNRS-industry contracts.

Compared to the 75 billion French francs [Fr] companies spend on their own R&D, the Fr620 million they funnel to the National Center for Scientific Research (CNRS) does not seem like much. And the 900 firms that are now teamed up with France's top public research organization may seem a tiny minority. But there is no question that a fundamental change is afoot, one that is rocking both the worlds of industry and research. The number of CNRS-company contracts has skyrocketed, shooting up from 252 in 1982 to 2,600 in 1991. The days when researchers saw industry as "blinkered" and "corrupt," when manufacturers disdained academics as "slackards" and "obscure," are ending. Today the two worlds are digesting their differences and trying to find ways to complement one other.

Next 27 January, the CNRS and its main industrial partners will take another step. Francois Kourilsky, the organization's general director, is the man behind a first-ever forum where the two sides will meet to compare scientists' and manufacturers' analyses of future

trends. The day's conclusions will be taken into account when the CNRS drafts its strategic outline for the next three years.

Company Consultation with a Researcher

The most basic form of collaboration is company consultation with a researcher. Indeed, the CNRS arranges it so that its researchers can spend 20 percent of their time offering intellectual services. In Toulouse, the Michel Daniel Bataillou Atelier du Vitrail company, which employs three people and has turnover of Fr600,000 from the manufacture and restoration of stain-glass windows, was advised by Pierre Souleille, a researcher with the Radiation Space Research Center (CESR). The goal was to adapt fine stain-glass windows to meet building (schools and houses) codes for solidity, by transferring an aerospace technology that could reinforce the windows. The technology in question was the bonding of glass onto selenium, a technique used in manufacturing solar panels. The consultation lasted a year and cost the small trades firm Fr100,000, half of which was subsidized by ANVAR [National Agency for the Implementation of Research]. As a result, the company has registered a trademark (Silovitrail) and has since been selling its know-how; 50 percent of its turnover is attributable to its collaboration with the CNRS. There is a caveat, however: Researchers are free to set their own rates. In the case of Pierre Souleille, "After a while, it was no longer worth it. With the overhead I had to pay as an independent researcher, my consulting brought in Fr50 an hour at best." Conversely, certain sought-after researchers charge much higher rates. It may be better to choose a good researcher than an eminent laboratory director.

Laboratory Services

The goal here is to offer the technical resources of a laboratory and its environment to companies. The laboratory may, for instance, analyze a sample on one of its apparati, or synthesize a few milligrams of a substance. "There is no official minimum rate for this type of service," says Pierre Vergnon, director of the CNRS's office of company relations. "Some services can be provided for as little as Fr5,000." But the service must involve real research. CNRS labs are not about to convert themselves into test or even supply labs. Accordingly, the Biotherm company's request that a laboratory perform the electron microscopy work for its antiwrinkle products was turned down, because the company was primarily interested in being able to write on the package that the CNRS had inspected the products! But services of this kind are not monitored very closely by the organization's management, resulting in an occasional slipup, especially as CNRS labs attract manufacturers with rates that are often lower than those of contract research companies!

Shared-Goal Contracts

Providing services is often the first step toward a more ambitious team endeavor, the shared-goal research contract. This type of contract is signed between a laboratory and a company for a one- to three-year program they have designed together. The manufacturer files for any patents in its name and at its expense, subject to two conditions: It promises to apply the results of the research project and, if successful, to pay royalties to the CNRS. The amount of royalties it will pay depends on the product (it differs for space shuttles and packaging!) and is set just before marketing begins. Inel company, for instance, pays royalties that amount to 5 percent of the price of the curved-blade detectors in some of its X-ray diffractometers, which it developed in collaboration with the Grenoble Institute of Nuclear Science.

On the average, each partner funds half of the cost of research, including researcher salaries. The budgets for the contracts run from Fr30,000 to Fr18 million (the latter is exceptional and applies to the joint research effort of Bristol Myers Squibb and the Strasbourg Molecular Biology Laboratory); the average is about Fr350,000.

A large share of the money is earmarked to fund theses. Indeed, most shared-goal contracts employ PhD candidates whose grants are cofinanced by the manufacturer. In 1991, 270 young researchers working on their PhDs in a CNRS lab were doing so under a shared-goal contract. Moreover, manufacturers have hired 300 doctoral students, whose salaries are paid in half by the CNRS. One example is Goemar Company (sales of Fr130 million), which employs 150 people and specializes in algae biology. Goemar cofunded two doctoral candidates at the Roscoff Laboratory for the Cellular and Molecular Biology of Marine Algae to study the cultivation requirements and commercial uses of red algae. The project will cost it Fr160,000 a year for the duration of the two theses (or two to three years).

These shared-goal contracts can enable a company to make a huge technological leap. Sorep (Fr150 million in sales, 260 people) was not disappointed in the contract it signed with the LPMO (Besancon Oscillator Physics and Measurement Lab) and the National Center for Space Studies (CNES). Its decision was triggered by a bid invitation published by the CNES for the industrialization of a micro-oscillator—patented by the CNRS and CNES—as part of the Sarsat Cospace program. Sorep kicked in Fr1.5 million, half of which was financed by an ANVAR innovation subsidy. The company has made 35,000 of the oscillators since obtaining the license for the product in 1986, which represents sales of Fr22 million, earned from both the Sarsat program and the telecommunications industry.

Researcher Loans

This option, although very simple and inexpensive, has not yet become part of the culture of either side. For six months to a year, a researcher is loaned to a private

laboratory while staying on salary with the CNRS. Longer loan periods require the company to reimburse the CNRS for the researcher's salary. This type of collaboration can cost the manufacturer nothing, and so should interest small companies. "To date, Elf is virtually the only group to host researchers," says Pierre Vergnon. There are two explanations for this failure. One, the CNRS is not yet really accustomed to dealing with medium-size or small companies; it is more at ease with big ones, which offer it more opportunities to win contracts. Two, some researchers still fear that moving into companies will hurt their careers, and they continue to shun the loan option.

Research Groups and Mixed Units

Besides shared-goal contracts, very large companies often choose two other types of team ventures, research groups and mixed laboratories. In the first, several research teams from industry, the CNRS, or other organizations work on a specific, shared topic at their respective sites. In 1991, there were 52 active research groups, involving 65 companies (Renault, Lyon Water Company, Aerospatiale, Rhone-Poulenc, Thomson, Electricity of France, etc.). They are the same companies that are active in mixed units; there are currently 20. Mixed units are set up at a company site or in a CNRS laboratory to perform research more basic than what the company in question usually does (see section entitled "A Laboratory for Two").

Finally, since the only way to do something right is to do it yourself, the CNRS allows researchers to create their own companies. In 1991, 21 researchers took them up on it. Vincent Mariette, a former researcher with the physical oceanography lab at the University of Brest, created the Gaec clam farm at the Etel beach in 1987. Attracted by the adventure of the thing, Mr. Mariette owes his company's survival to his experience as a former researcher. "We developed a farming-management software program and a production machine, which is very rare in an industry that is 50 years behind in mechanizing itself," he explains. In 1992, just five years after the company was founded, Gaec is about to post sales of Fr3 million with a staff of five. But adventure can wear an entirely different face. Explicite, tucked away in comfortable Parisian quarters, was created by a researcher from the Environmental Psychology Lab in Paris, Jean Chaguiboff. The firm devises questionnaires and studies on social issues in companies.

In many CNRS chemistry or physics labs today, over half of the research budget (excluding salaries) comes from contracts signed with industrial partners, who have become indispensable. This does not mean that all the problems of relations between research and industry have been solved. There are still gridlock points and suspicions. For instance, the contract between Bristol Myers Squibb and Professor Chambon's molecular biology lab stipulates that the manufacturer is the primary beneficiary of all the findings made in the laboratory. Many researchers will view this as an attempt to co-opt the skills and expertise of public research. Another wrinkle is that although the CNRS wants to open up to industry, it does not yet have a commercial culture. It has a slew of services to sell, but little idea of how to canvass. When the Atomic Energy Commission decided to reach out to companies, it set up a hotline and a network of engineers who solicit all small and medium companies, region by region. The CNRS has nothing of the sort. The 27 January forum may change that.

Table Information: Companies That Work with the CNRS

A total of 912 companies are currently working with the CNRS on research projects costing Fr620 [million]. Companies employing over 500 people number 326 and account for 70 percent of the total investments, or Fr434 million. Firms with fewer than 500 personnel (there are 456 of them) account for 19 percent of the research, or Fr117.8 million. There are also 130 foreign companies collaborating with the CNRS. They account for 11 percent of the monies involved, or Fr68.2 million. The source for these figures is the CNRS, 1991.

Table Information: CNRS Contracts By Economic Sector, Given as a Percentage of the Total (Fr620 million)

The distribution of research contracts by economic sector breaks down as follows: energy, 16.2 percent; chemistry and parachemistry, 15.8 percent; pharmaceutical, medical, and bio-industries, 15.4 percent; automobiles and transport, 9 percent; materials (plastics, glass, metallurgy), 8.4 percent; electrical and electronic equipment, 7.2 percent; aeronautics, 5.7 percent; information science, 3.1 percent; food industry and agriculture, 2.8 percent; machines and industrial equipment, 1.8 percent; various, 14.6 percent. Source: CNRS.

Box Information: How Much Does It Cost?

—Company consultation with a CNRS researcher: The rate is set by each researcher.

—Laboratory services to a company (essentially small and medium-size ones): starting at Fr5,000, no maximum.

—Cofunding of a thesis: about Fr90,000 a year. The doctoral work is done in the CNRS lab or at the manufacturer's site.

—Researcher internships in industry and vice-versa: Cost is negotiated on a case-by-case basis. The CNRS pays the salary of the researcher loaned to a company for one year.

—Shared-goal contracts: on average, Fr350,000, or about half of the budget (including researcher salaries).

—Research groups (several CNRS and industry teams working on a jointly defined research topic): a budget of about Fr1 million (excluding salaries), to be split.

—CRIN Clubs: from Fr6,250 to Fr100,000 in dues depending on the number of clubs a company is active in.

—Mixed research units (laboratories created jointly by a manufacturer and the CNRS): a budget ranging from Fr500,000 to infinity (exluding salaries), to be split.

How to Make Contact

There are two ways to hunt for an apartment in Paris. One is to methodically pore over the classified ads. The other is to talk about what you are doing, in which case it will be rare that a friend of a friend of a friend does not know someone who happens to be looking for a tenant. The same principle applies in collaborating with the CNRS. Team ventures get started most often between people who know one another, who went to the same schools or universities—not to mention the contracts between a company and the laboratory where its science director did his doctoral work. Symposia are an excellent way to make contacts. What is more, the CNRS fully grasps the value of such networking, since that is the principle underlying the CRIN clubs (see section on clubs in this article), where manufacturers and researchers meet.

When they have a good idea of the kind of research their problems will require, manufacturers may contact the science departments in Paris (see tables) directly. But contacts are often made indirectly. Technology transfer organizations such as CRITTs (Regional Center for Innovation and Technology Transfer) and technical centers "scare up" companies with research needs and direct them to the CNRS. In Grenoble, for instance, the Paper Technical Center created a research club christened "Paper and Derivatives" where CNRS, university, and manufacturer teams meet. Manufacturers can also directly contact the regional delegations of the CNRS. ANVAR, chambers of commerce and industry, and certain banks also act as go-betweens. It was through the offices of Banque Courtois, which has a skeleton agreement with the CNRS, that a small diamond-cutting firm in Montauban established contact with LAAS (Automation and Systems Analysis Lab). Today it is collaborating with the lab to automate its production.

Table Information: The Regional Delegations of the CNRS

CNRS regional delegations can be contacted by manufacturers who have no way of addressing a specific lab; they will direct the company to a laboratory in the region or to national science departments. Below is a list of the regional delegations, including the franc value of their contracts in 1991 (in millions of Fr), their contact person, and their telephone number, in that order.

1. Alsace: 45.9; Jean-Pierre Bouley; 88 28 67 19.

2. Acquitaine and Poitou-Charente; 39.7; Bordeaux: Pierrette Berger; 56 37 26 69; Poitiers: Michel Jaulin; 49 45 39 01

3. Brittany and Loire country: 16.1; Isabelle Vaisse; 99 28 68 68.

4. Center and Limousin: 22.9; Daniel Tinet; 38 51 76 06.

5. Ile de France: 168; Paris (5th, 6th, 13th districts): Jean-Francois Brault; (1) 49 60 41 02; Paris (other districts): Gilbert Gallo; (1) 44 27 30 29; East: Jean-Pierre Broyart; (1) 46 87 24 72; West and north: Pierre Rigaud; (1) 45 07 58 35; South: Herve Saint-Jaimes; (1) 69 82 39 06.

6. Languedoc-Roussillon: 34.1; Pierre Delori; 67 54 79 27.

7. Midi-Pyrenees: 26.7; Andre Maisonnat: 61 33 60 06.

8. Northeast: 56.4; Besancon: Claude Paulin; 81 66 69 66; Nancy: Francis Yguel; 83 85 60 43.

9. North-Pas-de-Calais: 17.4; Jean-Louis Picque; 20 12 58 01.

10. Normandy: 15.5; Catherine Quillard; 31 43 45 13.

11. PACA and Corsica: 22.3; Magali Roux; 91 22 40 08.

12. Rhone-Alps: 155; Alps: Gerard Vivier; 76 88 11 35; Rhone Valley: Michelle Guenin; 78 89 06 30.

Table Information: CNRS Collaboration By Science Department

CNRS science departments can be contacted by companies that already have a good idea of the type of research they want done. The following is a list of the departments, including their budget for 1991, the number of CNRS-industry contracts they are involved in, the overall value of those contracts, the contact person, and the department's telephone number. Amounts are given in millions of francs.

1. Nuclear and particle physics: 864; 9; 2.1; Claude Detraz; (1) 43 37 71 00.

2. Physical and mathematical sciences: 983.3; 295; 48.8; Daniel Thoulouze; (1) 47 53 10 30.

3. Engineering sciences: 770.8; 1,391; 267.4; Jean-Jacques Gagnepain; (1) 47 53 10 37.

4. Chemical sciences: 1,245.9; 1,306; 211.2; Paul Rigny; (1) 47 53 14 74.

5. Cosmological sciences: 903.7; 144; 21.2; Andre Berroir; (1) 40 51 20 05.

6. Life sciences: 1,960.5; 281; 61.5; Claude Paoletti; (1) 47 53 12 60.

7. Human and social sciences: 1,172.6; 93; 7.9; Alain D'Iribarne; (1) 47 53 11 00.

The CNRS's total 1991 budget is Fr7,900.8 million. The total number of contracts is 3,519, valued at Fr620.1 million.

A Laboratory for Two

Twenty mixed units combining a big manufacturer and a CNRS lab conduct research that is very much concerned with developments for the future.

Mixed research units (UMR) are the most successful type of collaboration between the CNRS and companies. They are also the type that least involve small firms: Of the 20 active mixed units, nearly all of them revolve around a multinational industrial group, French or not. Half of the units have a university as a third partner. The units, which are set up for four years and can be renewed nearly automatically, may be physically located at either partner's site (or, more rarely, at different sites). They are managed by a researcher from one of the subsidiaries. UMRs generally employ between 10 and 30 researchers and technicians, recruited more or less equally from the different partners, as well as doctoral students.

This formula for CNRS/company collaboration offers several advantages. The first is guaranteed project length (at least four years) and resources. Except for PhD students, researchers have an established position in the unit and are paid by their original organizations. The second is guaranteed freedom: Unlike the research centers of each of the manufacturers involved, UMR work is primarily oriented toward future developments and much less tied to results. The work does not usually involve finalized topics, but rather research that can solve knotty technological problems the manufacturer has encountered in his studies. The units' freedom can also be explained by the relative importance of a UMR, which generally accounts for less than 1 percent of a company's R&D budget.

Boxed Material: Three Examples of UMRs

1. CNRS/Bruker Spectrospin, "NMR and Molecular Modeling."

This is an original unit since it encompasses two laboratories: one at the University of Strasbourg from which its director came; the other at the manufacturer's, which makes equipment for NMR (nuclear magnetic resonance) spectroscopy in Wissembourg. The university lab does basic research on types of NMR and on ways to advance spectrometers. Bruker is responsible for developing them and demonstrating them to customers. The CNRS is going to beef up the unit's staff in 1993 and make it France's center for solids NMR.

The unit researches NMR in solutions (cobalt, ruthemium, etc.) and solid phases (cobalt, lithium...). There are 12 staffpersons at the University of Strasbourg 1, one-third from the CNRS, one-third from the university, and one-third doctoral students and interns. Bruker Spectrospin has five engineers working on the project. Its operating budget excluding salaries is Fr600,000.

2. CNRS/Saint-Gobain, "Glass Surface and Interfaces."

Created in 1990 at the Saint-Gobain Research site in Aubervilliers, it is the first mixed research unit headed by an industry researcher. It is also the first CNRS lab that specializes in studying the surfaces of insulating materials such as glass and ceramics.

Saint-Gobain, a supplier of products in which glass is combined with many other materials, wants to better understand the phenomena at play at the interfaces between them.

The unit researches four topics: the chemical reactivity of the surface of glass; the adsorption and adhesion of polymers; the growth of thin metal films; and the physics of glass breakage. It employs 15 people, one-third from Saint-Gobain, one-third from the CNRS, and one-third doctoral students and interns. Its operating budget excluding salaries is Fr1.2 million.

3. CNRS/Roussel Uclaf, "Synthesis of Bioactive Products."

This mixed unit is located at a Roussel Uclaf site and headed by a member of the CNRS. It was created to explore the synthesis of cortisone family products. In particular, the unit investigates ways to reduce the number of steps—and thus the cost—of cortisone synthesis. So far, the unit has demonstrated the validity of a schema proposed by Roussel Uclaf in which synthesis is reduced from about 30 to 10 steps.

The UMR researches the synthesis of cortisone (an anti-inflammatory and treatment for cerebral meningitis, acne, etc.) and of RU 486, which is used as an abortion pill or to treat breast cancer anti-hormonally. Its staff of 16 includes five people from Roussel Uclaf, four from the CNRS, and seven PhD students and interns. Its operating budget minus salaries is Fr300,000.

Table Information: List of UMRs

The following is a list of UMRs by date of creation, industrial or other partners involved, and research topics dealt with.

1. 17/2/81: SNPE (Ecole Polytechnique); phosphorus chemistry and transition materials.

2. 14/3/86: Rhone-Poulenc (Montpellier 2); precursor polymers for materials.

3. 26/6/84: Roussel-Uclaf; synthesis of bioactive products.

4. 14/4/86: Saint-Gobain; amorphous metal materials.

5. 28/6/86: Elf Acquitaine; catalytic engineering. Refinery reactors.

6. 18/6/86: Rhone-Poulenc Agrochimie; physiology and biology. Plant cells.

7. 28/11/86: French Petroleum Institute; catalytic engineering. Manufacture of catalyzers.

8. 10/2/87: Rhone-Poulenc; catalytic reactors in triphase media.

9. 29/1/88: European Propellant Co. (Bordeaux I); thermostructural composites. 10. 9/3/88: Biomerieux; molecular chemistry and biochemistry. 11. 1/7/88: French Petroleum Inst.; heat-stable polymers. 12. 14/10/88: Bruker Spectrospin (Strasbourg I); NMR and nuclear modeling. 13. 17/10/88: Matra (Toulouse 3, Midi-Pyrenees region); space information science. Man-system interfaces. 14. 23/1/89: Synthelabo Pharmacie (Montpellier 2); design of biomolecule analogs: application to antiviral drugs. 15. 1/1/90: Bull (Grenoble I, INPG); distributed computer architecture. 16. 9/3/90: Siemens Automotive (Midi-Pyrenees region); instrumentation. Microelectronic sensors for automobile driving. 17. 1/11/90: Saint-Gobain; glass surfaces and interfaces 18. 12/7/91: Rhone-Poulenc Rover; cellular and physical-chemical biology of endothelia. 19. 2/92: Rhone-Poulenc Rorer (Paris 11); molecular genetics of neurotransmission and of neurodegenerative processes. 20. 2/92: Sanofi; immunoanalysis and innovation in clinical biology.

The CRIN Club Craze

There are already 20 of them, drawing representatives from nearly 700 companies.

When a researcher meets another researcher, they talk...researcher shop. That is the principle ECRIN [Research-Industry Exchange and Coordination] uses in coordinating the meeting clubs it has christened CRIN and which gather government and industry researchers. The sole purpose of ECRIN is to spur public and private research departments to set up joint projects and to encourage manufacturers to work together on precompetitive research. It does this by organizing meetings on well-chosen topics that interest all the players. The association neither finances nor sets up research programs. It also shys away from brokering technologies. ECRIN enables researchers from very different backgrounds to meet, and perhaps sign some contracts.

A CRIN club is how researchers from Lu, Pechiney, the University of Toulouse electrical engineering lab, the Textile Institute of France, and the Paris School of Mines Materials Forming Center got together, in the Agriculture/Food Industry Club. Less than a year after the club was formed, they have put together a program financed in part by each member. Its object is to study new plastic films for packaging, made more water- and oxygen-proof through aluminum and silicon deposits.

Hubert Curien created the CRIN clubs in 1973 during his stint as director of the CNRS. In 1990, the CNRS decided to team up with the other big research organizations CEA (Atomic Energy Commission), INRA (National Agronomic Research Institute), IFP (French Petroleum Institute), ADEME [Agency for Environment and Energy Control], and CNES, and transfer the clubs to ECRIN. Big manufacturers such as Aerospatiale, Elf Acquitaine, EDF, Lyon Water Company-Dumez, Peugeot, Rhone-Poulenc and others joined the association's board of directors. Since this makeover, there has been an unprecedented craze to join the clubs. The total number of participants jumped from 1,640 in 1989 to 4,954 in 1991, and 666 companies are involved (see diagram below for distribution). Twenty clubs meet regularly, and four others are in the works (Medications Club) or planned (Changing Work World and Skills Training Club; Sports, Science, and Technology Club; Odor Pollution Treatment Club). "For these meetings to be useful," explains Serge Gross, ECRIN's general delegate, "participants must be competent and in a position to make decisions in their laboratories." Students are not welcome. Serge Gross points out that "companies pay dues so that their researchers can participate in the clubs (see boxed material). In return, they are involved in choosing the discussion topics and make sure that the clubs remain interesting and worthwhile."

Each club has a manufacturer as its president, who is seconded by a public researcher. Day to day matters are handled by an association member, who is assigned by a company or research organization. The clubs meet three or four times a year. Meetings consist of a series of presentations, which are followed by discussions: Most important, however, they enable participants to meet. In between meetings, working groups dealing with very specific topics (examples include the "Process Control" group in the Fuzzy Logic Club, or "Ecotoxicology" in the Environmental Club) also meet. No opportunity to promote exchanges is overlooked, whether it be reports on congresses, inviting the author of a ministry report, or personal accounts. Human sciences are also included. Roussel Uclaf spoke to members of the China Club about its experience setting up shop in that country. The clubs' very flexible organization can be modified at the request of a participant. In the opinion of Jean-Pierre Monget, William Saurin's technology director, "CRIN clubs broaden our horizons and enable us to make contact with laboratories we didn't even know existed. The fact that we have not signed a contract with other Agriculture/Food Industry Club participants doesn't mean we haven't made some interesting contacts." In contrast, others have already taken the plunge. According to Bernard Monasse, who is in charge of the program at the School of Mines, of the 20 topics dealt with by the club's participants over the last year, 10 have, or probably will, produce collaborative research programs.

Boxed Material: What It Costs to Join ECRIN

Club(s) are joined by legal persons. Several classes of membership are available. For Fr100,000 a year, a company can regularly send researchers to any and all CRIN clubs. For Fr25,000, it has membership rights in just five. Companies employing fewer than 500 can join only two clubs, at a cost of Fr6,250 a year.

Whom To Contact?

Listed below are the presidents and contact persons (in that order) for each club, all of whom belong to the

ECRIN association, 28 rue Saint-Dominique/75007 Paris. Telephone: (1) 45 50 48 11. Fax: (1) 47 53 02 91.

1. Agriculture/Food Industry: A. Frouin (Bongrain); Claude Vialle.

2. Food Aromas: P. Delest (Sanofi Bio-industries); Marie-Claude Vitorge.

3. Biotechnologies: G. Nomine (Organibio); Michel Igor Gourevitch.

4. China: P. Ventadour (Codasie); Veronique Conde.

5. Combustion: P. Eysat (IFP); Dominique Antoine.

6. Cyrogenics and Superconductivity: J.-C. Bobo (Alcatel Alsthom); Jean-Lionel Beraud.

7. Power electronics: P. Rossetti (Valtronic); Jean-Lionel Beraud.

8. Environment: T. Chambolle; (Lyon Water Company-Dumez); Jean Cesario.

9. Biomedical Engineering: J.-C. Bisconte (Biocom); Monique Krieger.

10. Heterochemistry: F. Leising (Rhone-Poulenc); Dominique Antoine.

11. Fuzzy Logic: J.L. Vernet (Thomson-CSF); Roland Mas.

12. Materials; J. Devriese (SNECMA); Roland Mas.

13. Industrial Materials for Civil Engineering; G. Ribes (Sika); Claude Vialle.

14. Analytical Methods: J. Mallevialle (Lyon Water Co.-Dumez); Jean Cesario.

15. Perfumes and Scents: J.J. Vignault (FIP); Dominique Antoine.

16. Petroleum and Fossile Fuels: B. Tissot (IFP); Dominique Antoine.

17. Photonics and Lasers: H. Arditty (Photonetics); Jean Cesario.

18. Neural Networks: M. Trouble (Framatome); Jean-Lionel Beraud.

19. Production Systems and Human Factors: F. Decoster (Renault); Nane Pehuet.

20. Transports: J. Bouttes (Intertechniques); Roland Mas.

Institute Reports on Drop in Eastern German Industrial Research

93WS0203A Duesseldorf HANDELSBLATT in German 4 Jan 93 p 6

[Unattributed Article: "IWH: It Is Much Less Expensive to Maintain Than To Recreate Research Resources"]

[Text] The Halle Institute for Economic Research (IWH) has stated that industrial research in the new federal laender is in grave jeopardy.

In its most recent economic report, the Institute bemoans the fact that the drop in industrial output is accompanied by a decrease in industrially-oriented research, even though such research is an important prerequisite for economic recovery. Consequently, the institute is calling for, among other things, the federal and land governments to provide financial funding for the in situ restructuring of existing research and development (R&D) resources.

According to the report, the decline in eastern German industrial research has reached the crisis level, and the percentage of research personnel in the new laender has dropped below that of research personnel in the old laender. According to the results of a representative survey taken in October 1992, of the approximately 75,000 industrially-oriented research personnel working in eastern Germany in 1990, only 15,000 remain. In western Germany, there are seven research personnel for every 100 industrial employees; in eastern Germany, the ratio is one for 100.

The decline in the number of research personnel in the basic industries is even more dramatic. In electrical engineering, for example, the number of R&D personnel has dropped by 90.8 percent since 1989, from 17,752 researchers to just 1,634. A similar situation exists in the chemical, mechanical engineering, precision technology, optical, and watch and clock-making industries.

Following privatization, certain enterprises have had their once internationally renowned R&D programs completely eliminated. The survey also revealed that independent research institutes and research departments in Trust Agency companies have also suffered deep cutbacks in their research personnel. The IWH attributes this to, among other things, a growing reluctance of buyers of Trust Agency enterprises to retain R&D personnel.

The IWH contends that this development in eastern German industrial research is hindering industrial rehabilitation. A lack of creative research will result in a lack of innovation, which will in turn discourage investment. As a result, product and procedural innovation are important prerequisites for long-term eastern German competitiveness.

Innovation and innovative enterprises are also essential if eastern Germany is to attract investors. This investment could in turn serve as the stimulus for a general upturn in

the economy. Consequently, the Halle institute counsels against considering research and development on the basis of labor market policy alone. Rather, it should be regarded as a necessary investment in the future.

The institute commends the fact that many economic policy measures are being taken to increase the innovative ability of eastern German enterprises. But it complains that it is still unclear whether the funds earmarked by the Ministry of Research and Technology will also be available beyond the short term. The institute cautions: "R&D resources can be lost quickly. It will be 10 times as expensive to reestablish them as it is to maintain them."

With regard to the call for in situ financial support for existing qualified R&D resources, the institute admits that the development of new structures will involve both time and money. As a result, financial support from the federal and state governments will need to be continued over an extended period of time. The institute considers it important that the R&D programs that still remain be afforded the same legal and financial terms as are research institutions in the old laender. Eastern German institutions are in need of foundation, or basic financing. Only a small percentage of their overhead can be financed through individual project funding.

As far as the drain in R&D resources in Trust Agency enterprises is concerned, the IWH proposes that it be halted by degressive interim financing by the federal and land governments over the next three to five years. The institute also expects the Trust Agency to provide direct financial support. Research and development personnel who are currently "parked" in job creation measure programs should be rapidly integrated into industrial research facilities. Furthermore, the institute states that the funding limit applied to enterprises with less than 1,000 employees is having a detrimental effect.

The IWH also points out that limited finances make it impossible for many enterprises to provide the required 40 to 60 percent individual contribution to research funding. These companies are therefore denied the innovations they need to survive. Furthermore, this has prevented the funds earmarked by the Research Ministry for research and development in 1992 from being completely expended. The Halle Institute proposes that the required individual contribution be reduced to 20 percent, depending on the profits of the individual enterprise.

The institute also suggests that independent industrial research institutions in eastern Germany be relieved of old debts and debts resulting from liquidation, that they be allowed to purchase fixed assets and property at reasonable rates, that they be given equal treatment during bid invitations, that eastern German researchers be given fair consideration by advisory committees, and that the number of West-East research contracts be increased. If as little as 50 million German marks [DM] of research contracts were awarded to eastern German researchers, ongoing financial support for research in the new laender would be unnecessary. Moreover, this figure represents only 1 percent of the total amount spent by western German businesses on external research.

Continuing Political Discussion on Research Policy

93WS0203B Frankfurt/Main FRANKFURTER ALLGEMEINE in German 5 Jan 93 p 12

[Article by K. B.: "The Research Minister Does Not Want To Be A Truffle Pig—Discussion of the Role of the State in Technological Development"]

[Text] To the delight of industry, there is increasing call from all political corners for representatives from business and the government to sit down together regularly in order to ensure the competitiveness of German industry. At the same time, businessmen and scientists are being urged to work together more systematically in order that findings by industrial and research laboratories be more rapidly and productively employed on the international market. The technological restoration of Germany should be accelerated. Even before the turn of the year, Research Minister Heinz Riesenhuber appealed to industry not to neglect innovation. He is afraid that a slumping economy will lead to a decline in the resources necessary for innovation.

Economics Minister Juergen Moellemann has latched onto innovation as a popular new theme. He is calling for it to be included in the agenda of the "Education Summit" that the Chancellor has announced for next year. Week after week, discussion groups are held—with varying degrees of attendance—on the subject of the technological restoration of Germany. Memorandums and reports on the subject are submitted by the dozen. The most recent of these, a discussion paper, is from the Friedrich-Ebert Foundation, which is closely tied to the Social Democratic Party of Germany (SPD).

Research Minister Riesenhuber is repeatedly asked what the German innovation system of the nineties will be. He is informed that, as the key element in industrial policy, the state must play a more active role in technological policy and more strongly influence new technological developments. This meets with wide approval. The conflict arises over the question of exactly what role the state should play. In a debate during budget week, one woman stated that the government must determine what is important. Riesenhuber replied that under no circumstance does he want to be a truffle pig, rooting out the creme de la creme. Businessmen and researchers must pick up this trail by studying the market. As terrible as the analogy with the truffle pig is, said the young entrepreneur Toni Leyendecker during a research ministry discussion round, it can still be a very illuminating image. Because truffle pigs root out truffles not when they have a full stomach, but when they are hungry and trying to survive. The founding period of a business, particularly one that is technology-oriented, can only be survived if its personnel are "terribly industrious and

imaginative" 100 percent of the time. It is the survival instinct which generates innovation.

Despite all the talk about promoting innovation, says Riesenhuber, in the end the survivors are those that are competent, those that from the very outset go after that which has market potential. The state cannot create a market; rather, it must give businesses and businessmen the courage to believe in themselves. Businesses, researchers, and the market need as much freedom as possible, because without freedom there can be no innovation. A professor of innovation, Professor Michael Gibbons, director of the Science Policy Research Unit at the University of Sussex, disapproves of selective research aid targeted at individual innovation projects. He maintains that Germany and Europe need a system of innovation that is as dynamic, open, and flexible as possible. This is the joint task of the state, the economy, and science. And however much we may applaud cooperation, dynamism is born out of rivalry. Gibbons claims that it is this competition, like a horse race, that the government must stimulate. Riesenhuber agrees. He believes that it is necessary to have discussions between science, business, unions, and the state. A "networked dialog" must be achieved. Riesenhuber has formed discussion groups by the dozen, but Michael Catenhusen (SPD), chairman of the Bundestag Research Committee, maintains that Riesenhuber has not brought together the right people. In the Ebert Foundation discussion paper, which Catenhusen co-authored with Ebert Foundation department head Werne Fricke, the state is assigned the role of moderator in an intensive "dialog" between business, science, and social organizations. Catenhusen no longer supports the traditional SPD position that the state could or should be the primary architect of social or technological developments. Today's realities require a departure from such technological policy, says Catenhusen. He hastens to add, however, that this is not an SPD discussion paper. In proposing a departure from technological policy dirigism, the authors do not mean to imply that the state should restrict itself to establishing appropriate conditions for research, development, and innovation. The state must establish guidelines for business and science, says Catenhusen, which will be the basis of strategies for the future of the competitiveness, for more humane working and living conditions, and for more environmentally sound living. Such cooperation between government, business, and science is based on long-term concepts. Catenhusen himself doubts that such a group dialog would contribute to the short-term adjustment of businesses and research institutes to increasingly short innovation cycles. But it must under no circumstances inhibit innovation.

Germany: BMFT Transfers Responsibility for Renewable Materials R&D to Agriculture Ministry

93MI0229 Bonn WISSENSCHAFT WIRTSCHAFT POLITIK in German 3 Dec 92 p 3

[Text] The federal government is to bring its funding for renewable raw materials together next year under a specialist agency reporting, for market reasons, to the Federal Minister of Food, Agriculture, and Forestry (BML). The Federal Minister of Research and Technology (BMFT) will therefore relinquish responsibility for research and development on renewable raw materials at the start of 1993.

In addition to being responsible for testing and marketing strategies, the Renewable Raw Materials Agency will also be in charge of the requisite research and development, building on an extensive BMFT funding program. Starting from the results of pioneering biotechnology programs (such as those concerned with the chemistry of natural substances and plant breeding), from 1986 to 1991 the BMFT provided annually increasing allocations totaling around 100 million German marks [DM] for a separate, self-contained funding program of research and development on renewable raw materials.

This sum will grow by at least DM30 million during the current 1992 budgetary year. This program was intended to open up new markets for renewable raw materials by funding research on the various lines of development. In order to maintain a balance in funding initiatives, it is useful to differentiate between renewable raw materials for industry and those for energy generation.

The primary factor that makes processing renewable raw materials for the industrial sector economically attractive is that it takes up less land than the production of renewable raw materials for energy purposes. Renewable raw materials are currently being grown in Germany on a total of around 210,000 hectares, the main focus being on starch and rape oil.

Experts estimate that, depending on the general trend in demand, a further 200,000 to 750,000 hectares of agricultural land could be used to produce industrial plant crops by 2005.

The research funding priority was to open up innovative applications, some of which would have a high research requirement. The emphasis was to be on the right technical exploitation of vegetable raw materials, with a view to developing new techniques for converting the source material throughout the entire production sequence, and opening up innovative markets.

Oils and fats are examples of complete product lines funded in this way. The energy sector requires a very differentiated approach taking account of technical feasibility, economic viability, and ecological effects. Estimates for this sector are in the region of 3 million hectares, a figure that could be achieved by 2005.

Germany: GMD Leads BMFT-Funded Multimedia R&D Project

93MI0241 Sankt Augustin DER GMD-SPIEGEL in German Dec 92 pp 5-7

[Excerpt] [Passage omitted] POLIKOM, an innovation-oriented Federal Research Ministry program, is designed to create information technology links between Bonn

and Berlin. On the basis of long-term systematic applications, it aims to provide specific solutions for handling distributed government functions, following partial transfer of the government to Berlin. The project represents the response to a call from the Bundestag, which resolved on 20 June that "use of the latest information and communications technology is of particular importance for the efficiency and integration of the constitutional bodies." A further aim is to support the integration of the regions and centers within a united Europe.

The GMD [Society for Mathematics and Data Processing] has been commissioned to plan this 120-million German mark [DM] program and create the conditions in which it can be carried out jointly by all the organizations involved. In previous research projects, the GMD has already developed various core components and prototypes, which were presented as a complete system during a conference at Birlinghoven.

The GMD's scientists consider close cooperation between research and industry to be absolutely essential to providing governments, ministries, administrations, and management with integrated, compatible systems that will be a match for the stringent and changing requirements of everyday use in the limited time available.

The installation and pilot operation of the OBC platform in the GMD's three branches in Sankt Augustin/Bonn, Berlin, and Darmstadt. OBC stands for office broadband communication and the eponymous BERKOM [Berlin Communications] project under which this technology was developed.

The multimedia workstation with its audio and video accessories is linked via an audio-video module and a broadband switching center to German Telekom's 140-megabit per second broadband switching network. Its functions extend not only to high-quality audio and video links between two or more callers, but also to facilities for joint editing, the simultaneous, joint processing of documents with real-time text and graphics and video freeze-frames.

This new integration process is currently being piloted in the everyday work of 16 GMD offices. First impressions have already shown that the availability of these systems at the workplace gives them a far higher acceptance level than, for instance, videoconferences situated at a distance.

This is, of course, helped by the system's much simpler mode of operation from a familiar user interface, and the novel joint editing function.

Meanwhile, more advanced developments using UNIX platforms with OBC links have become available. For istance, working GMD prototypes of an activity assistant, an organization and knowledge base, a hypermedia author system, multimedia mail, including video, and safety functions, such as electronic signatures are now on show and are available in integrated form as working environments.

The POLIWORK project, too, has just been launched at the GMD Institute of Application-Oriented Software and Systems Engineering. The purpose of POLIWORK, which is part of the POLIKOM integration project, is to open up innovative, communications technology-oriented support applications for joint procedures among pilot users, and to gear these applications to POLIKOM. The intention is to develop prototype scenarios for multimedia applications and associated network connections using commercially available hardware and software. [passage omitted]

Multidiscipline Microsystem Seen as Keystone of Fourth Framework Program

93BR0287 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 10 Dec 92 p 5

[Interview with Marcel Hugen, deputy of the Microelectronics Unit within the EC Directorate-General XIII, by Didier Girault: "Research That Directly Serves Industry"]

[Text] The authorities of Directorate-General (DG) XIII in charge of the European Strategic Program for R&D in Information Technologies (ESPRIT) in Brussels select ESPRIT projects and their participants according to their industrial usefulness. According to Marcel Hugen, deputy of the Microelectronics Unit of DG-XIII, the idea of the microsystem will be one of the keystones of the fourth ESPRIT framework program.

Girault: How do you assess the results of the ESPRIT research program in the area of microelectronics?

Hugen: Results are excellent in the silicon area, where we are in charge of research upstream of JESSI [Joint European Submicron Silicon Initiative] through programs dedicated to CMOS [complementary metal-oxide semiconductor] and to design tools such as Joint Logic, Manufacturing Science Technology (MST), Adequat, and JESSI Common Framework. Within the scope of Joint Logic, qualification of the 0.7-micron CMOS production equipment has been completed and know-how is now being transferred among participants. In CMOS, the Access project has merged with Joint Logic and forms Joint Logic 2. We are continuing our activity and expect the 0.5-micron CMOS process to be ready for qualification by the end of 1993 and for installation in all the companies by 1994. We are also very proud of the Manufacturing Science Technology program aimed at improving 1-micron and 0.7-micron CMOS production processes and equipment. This is the very first program in the history of semiconductors which involves most of the major manufacturers. In the longer term, the Adequat R&D project for 0.35-micron and 0.25-micron CMOS technologies began in June 1992. The partners have selected the participating institutes on the basis of their industrial preoccupations and competence. In fact, we wish to have research which serves industry. The overall budget earmarked for all the JESSI programs represents 55 percent of the ECU235 million budget allocated to the first phase of ESPRIT 3. ECU14 million

have been allocated to Adequat (18 months), ECU60 million to Joint Logic (three years), ECU31 million to MST (two years), and ECU21 million to JESSI Common Framework (three years).

Girault: What are your other activities, apart from those concerning CMOS?

Hugen: The Tip Base program dedicated to bipolar technology will be finished in a few months. It has accomplished its mission and resulted in the development of highly advanced analog and hybrid bipolar technologies. The Tip Base results will be used in future BiCMOS [bipolar CMOS] research. It is, however, not certain that research on "pure" bipolar technology will be continued because it does not have any priority over CMOS. The most interested sectors, telecommunications and consumer electronics, can live with the current know-how. I would like to emphasize the importance attached by the EC to the fields of sensors and actuators that are of great interest to developments in the automobile and consumer electronics sectors. Research covers all kinds of sensors. It will enable us to consider the development of highly integrated devices or microsystems (systems on a single chip). The research on application-specific circuits already completed, on multifunction technologies (with power integration, for instance), and on multimodules (Apachip and Ibcar programs) will enable us to take on the microsystem. Accomplishing this full integration may, however, take about 10 years. To me, the idea of the essentially multidiscipline microsystem is one of the keystones of the fourth framework program.

Girault: Which strategy should Europe adopt in semiconductors vis-a-vis the United States and Japan?

Hugen: In view of the high investments ($1 billion) required for setting up manufacturing units for mass consumption products (memories, logic circuits, etc.), multiple alliances will be the rule. The know-how and expertise acquired by the Europeans through these alliances can help them improve their technologies. But in addition to this system of alliances for standard products, application-specific circuits will have to be manufactured dedicated to telecommunications, automobile, or consumer electronics applications (I am more reserved about information systems). In this context, it is very important in Europe to set up a system of close relations between manufacturers and equipment makers so that products can be marketed rapidly. If in fact there were semiconductor alliances with Japanese or American firms in this area, there would be the risk of strategic information being diverted.

In order to efficiently meet demand in small volumes, we also need flexible plants, such as ES2 [European Silicon Structures], that are capable of changing technologies rapidly and at low cost.

Fourth Framework, New ESPRIT Programs Target Information Technology

93BR0299 Amsteram COMPUTABLE in Dutch 11 Dec 92 p 13

[Text] Brussels—The EC must invest many billion guilders in supercomputer R&D. This is stated in a report published by a committee under the chairmanship of Prof. Dr. C. Rubbia (CERN [European Nuclear Research Center]). The committee was set up by the European Commission. The report covers the needs of European researchers in the field of very powerful computers and networks. Specific details from the report will be announced this week during the 1992 ESPRIT [European Strategic Program for R&D in Information Technology] Conference in Brussels.

Discussions on future collaboration in the field of information technology within Europe, which have been intensified this year, are expected to reach a climax during the conference. Information technology is not only important for Europe's industrial competitive position, but also as a means for meeting social needs. By now, the Third Framework Program for R&D is well under way. This program is intended to step up cross-border cooperation between companies and research institutions and among the companies themselves. Following a first audit, 311 new projects qualified for EC support. In addition, EC support was given to nine networks consisting of research teams from public and private laboratories with joint long-term aims for technology development. The new projects contain 99 actions and workgroups for basic research.

Fourth Framework Program

At the same time, the Fourth Framework Program, which will run from 1994 to 1998, is being prepared. It aims to increase concentration among a number of generic technologies which are essential for the competitive power of European industry. During this new period, special attention is to be given to so-called megaprojects. These are technological priority projects; activities intended for the structuring of the single market; research on standards, norms, and regulations; and activities supporting the development of EC-wide integrated network systems and mobility programs.

Project Proposals

Two major research areas qualify for subsidies under the new Framework Program. These are science and technology for industrial innovation and science and technology which can improve the quality of life. Interest in ESPRIT (information technology) is still very high. More than 1,650 companies and 720 universities and research institutes have submitted a total of 1,259 project proposals. Interesting new ESPRIT projects include, among others: Quick-chips, a system for the fast production of ASIC [application-specific integrated circuits] prototypes; Chip-shop, inexpensive IC prototyping services

for small and medium-sized enterprises; Hamlet, powerful computers for industrial applications; Power, a portable workstation for educational purposes; and CIA, computer integrated agriculture.

At the ESPRIT exhibition, there will be demonstrations of a driverless car, a speech recognition system that can cope with a great deal of background noise, real-time observation of moving objects, a three-dimensional tracking system for cars and aircraft, and the "boundary-scan test" with which Philips is already recording sales successes. There will also be a demonstration of a project involving the development of an integrated platform for programming, operating, and maintaining multivendor distributed systems.

An example of a recent successful ESPRIT development is the Newton "personal assistant," a combination of a portable electronic notebook, word processor, fax machine, and computer. This machine, recently brought out by Apple, is based on a chip developed by Acorn, the British subsidiary of Olivetti.

Belgium: Flemish Government Increases Research Funding

93BR0310 Antwerp DE FINANCIEEL-EKONOMISCHE TIJD in Dutch 17 Dec 92 p 3

[Article signed J.V.D.: "Flemish Government Increases Its Support for Biotechnology by 400 Million"]

[Text] Brussels (TIJD)—The Flemish government decided yesterday [16 Dec 92] to increase scientific research efforts in several fields. They have therefore stepped up their support for biotechnology centers by 400 million Belgian francs [BFr]. The National Foundation for Scientific Research [NFWO] is to receive an extra BFr100 million to hire new researchers for an indefinite period.

In the framework of the Flemish Action Program for Biotechnology, an extra BFr400 million will be allocated during the next five years to the biotechnology centers run by Professors Fiers, van Montagu, Hamers, and the bioconsortium of Professor Vandenberghe. Other, smaller centers yet to be chosen can count on support of BFr200 million.

In addition, the Flemish government has fixed this year's subsidy for the collective research centers (connected with sector-related employers' federations) at BFr102 million. Another BFr72 million will be granted to support the transfer of research results to industry. The government is prepared to grant additional funding for joint strategic research to the tune of BFr200 million.

With the injection of BFr100 million, the NFWO will again be able to hire new researchers for terms of unrestricted lengths. Last year, the Flemish section of the partially regionalized NFWO decided to call a halt to staff hiring due to a lack of funds. This was one of the reasons that led to the waves of protest which ran through the scientific community at the end of last year.

Yesterday, the Flemish government also contracted out several research projects. The first such project involves the development of a multimode traffic and transportation system model for the Antwerp-St. Niklaas area. The model should deal with all aspects of the transportation problem and enable policy makers to evaluate alternative transportation policy options. The project was contracted out to a temporary association of study bureaus (SITECH, Tractebel, the Dutch DAC, TKB) and the UFSIA [Antwerp University of St. Ignatius] Professors Vandevoorde and De Brabander. The NMBS [Belgian Railway Company] and De Lijn [Flemish public transportation organization] are also involved in the study, as is the province of Antwerp and a number of mixed public/private utility companies and private firms. The project costs BFr53 million, of which the Flemish government is providing BFr43 million.

It was also decided to enter into an agreement with the University of Ghent allowing the university to carry out additional forestry research for a period of one year. A grant of BFr16 million has been set aside for this research contract which will provide work for 10 researchers.

The government also gave the go-ahead for the establishment of the ministerial offices at the prestigious Martelaars [Martyrs'] Square in the heart of Brussels. Yesterday the rental agreement with purchase option was approved between the Flemish community and the NV Gimo-Hold real estate development company. The GIMV [Flanders Regional Investment Company] will be the majority shareholder. The allocation of the buildings for the various offices was immediately decided. Only the ministers of education and the environment will have to find a home elsewhere, more specifically in the buildings which are being planned for their departments in the neighborhood of the North Station.

In addition, the canal bank reinforcement works on the Antwerp Linkeroever (left bank) were subcontracted for an amount of BFr62 million.

Europe: Six Countries To Coordinate Technology Promotion Projects

93BR0311 Paris COURIER ANVAR in French Nov-Dec 92 pp 1-2

[Text] Kick-off of eventful days for ANVAR (National Agency for Research Implementation): Six European nations will see their innovation-promotion agencies incorporated in a network that helps small- and medium-sized enterprises [SMEs] in their efforts to find partners, and ensures coordination of the financing required for carrying out joint R&D projects.

There is nothing artificial about this method. Each participating agency in the network is responsible for national policy to support innovation in SMEs. Each one benefits from a regional set-up with direct on-site contact. Each one

has to take into account the economic situation, where international technological cooperation is more and more a must. Therefore, the different national networks eventually had to be interconnected. Henceforth, Tekes (Finland), NTNF (Norway), Senter (Netherlands), ENEA (Italy), CDTI (Spain), ANVAR (France) and, soon, Nutek (Sweden) will unite their efforts.

The beneficiaries will, by and large, be SMEs and SMIs [small- and medium-sized industries]. Flexible and responsive, they hold the key to any economic recovery. Their participation in European programs and in the EUREKA (innovative technologies) initiative, however, is still too low. Although SMIs represent 71 percent of EC companies, their involvement in EUREKA-type projects is not more than 25 percent and less than 10 percent in EC programs. This is caused by lack of knowledge about the latest tools as well as by difficulties in responding to calls for proposals and in coming out of their isolation to find an ad hoc partner and suitable financing.

Information and Harmonization

The new association's role is, therefore, to help SMEs participate in bilateral or EC partnerships; ANVAR's regional delegates will play a major part in this. They will be in constant liaison with the new network; will circulate information and requests between countries; look for foreign partners for the SMIs; locate—in France or among their foreign counterparts—the experts necessary for this or that project; direct companies to a reliable source of finance; help them, directly or by means of consultants, prepare the files. Harmonization also means to share, as often as possible, the means for supporting innovation, i.e., business conventions, finance centers, technology exhibitions. Each country learns from its own experience in harmonization, not forgetting that of the EC, as shown for example in the SPRINT [Strategic Program for Innovation and Technology Transfer] program.

Finally, the synergy between the different members, their in-depth knowledge of the local situation, and their independence in granting aid enable members to set themselves an operational objective: namely, coordinate financing so that files connected with the same R&D project can be processed at the same time. This is a decisive aspect for the future of European SMEs and made the creation of such an association vital.

Dutch Science Minister's 1993 Priorities Outlined

93BR0334 Rijswijk POLYTECHNISCH WEEKBLAD in Dutch 24 Dec 92 p 3

[Text] Scientific research policy will be in closer keeping with technological and industrial policy. That is, if it were up to Minister Ritzen of Education and Science. He stated this in the science budget he presented to the Parliament last week.

Ritzen advocates a national research strategy geared to European developments, with a major role for the Dutch Organization for Scientific Research (NWO). First, he will talk to the universities about priority shifts; if necessary, he will transfer 60 million guilders in research funds a year as of 1995.

For instance, shift from fundamental research in microelectronics to more application-oriented research in information processing. More funds should also be appropriated for polymer technology, biotechnology, environmental economics, durable development research, and traffic research. This will be at the expense of health research, among others. According to the minister, not only universities, but also TNO [Dutch Organization for Applied Scientific Research] and other research institutes should make clear choices and adjust their research to social developments.

In the Science budget, much attention is paid to industry and the environment. Ritzen is concerned about the decrease of Dutch research expenditure as a percentage of the GNP, not only by the government, but also by private companies. In his opinion, research can be stimulated by creating knowledge networks between companies and research institutes, as well as opportunities for public-private cooperation.

Biotechnology

Minister Ritzen, Minister Andriessen [economic affairs], and the NWO are willing to invest 20 million guilders in the three university centers for biotechnology, if industry contributes an equivalent amount. Part of these government funds will be taken from additional natural gas profits that the government reserved for infrastructure improvements, such as the construction of the Betuwe line. Ritzen and Andriessen argue that biotechnology and information technology know-how is also part of the infrastructure.

CORPORATE ALLIANCES

Materials Information, Economic Interest Group Formed

93WS0135C Paris L'USINE NOUVELLE in French 19 Nov 92 p 28

[Article by Dominique Commiot: "Simafor, Materials Properties Expert, is Formed"]

[Text] The new service group combines the Ecole des Mines research centers and an expert in complex phenomena simulation software.

How many flight hours would it take before the rivets holding the Boeing 747 engines to the wing are likely to give way? If the correct answer to this question had been available, the El Al plane crash over two buildings in the Amsterdam suburbs might have been avoided. Manufacturers wrestling with problems of this kind will know where to turn from now on. Simafor, France's first specialized service group, came into being this week. The

goal of this economic interest group combining Transvalor and Simulog is to answer the pointed questions that will be put to them by enterprises concerned with the shaping, fatigue, and fracture mechanisms of all types of materials subjected to forging...

Direct offsprings of public research, the two Simafor partners will pool their high level expertise for this complex discipline. Transvalor, the implementation agency for projects conducted at the 80 research centers that form Armines (Ecole des Mines), achieves 30 percent of its turnover (13 million French francs [Fr]) from software that simulates materials behavior during forging, extrusion, compacting, expansion, or heat forming. These are products designed in research laboratories, and supported, developed, and marketed by Transvalor. Its software packages Forge 2 and Forge 3 are in use at PSA, Renault, Aerospatiale, Dassault and Rolls Royce as well as at such PMEs (small and medium-sized enterprises) as Mecacentre, a Saint-Etienne enterprise specialized in cold forging.

As for Simulog, a computer and data processing company, it is the first direct industrial outgrowth of INRIA [National Data Processing and Automation Research Institute]. Founded in 1984, and still an affiliate of Inria, Simulog (with a Fr44 million turnover and a staff of 75) has carved a fine reputation for itself in the field of complex phenomena simulation software, in the use of formal calculation for robotics, and in fluid mechanics applied to composite materials. It notably developed Simail, the first three-dimensional automatic mesh program, a CAD technique through which objects are represented as trellis structures.

Christian Saguez, director general of Simulog, says that "large enterprises will be the principal market for Simafor." But there probably will be a market opening among PMEs for whom the purchase of a software package, and especially the support of a specialist would be too heavy an investment.

European Alliance To Compete With Japan in Flat-Panel Liquid Crystal Display Production

93WS0154A Paris LE MONDE in French 29-30 Nov 92 p 18

[Article by Pierre-Angel Gay: "Three-Way European Alliance in Flat Panel Displays"; first paragraph is LE MONDE lead]

[Text] The European groups Philips, SAGEM [Company for General Applications of Electricity and Mechanics], and Thomson Consumer Electronics (TCE) will establish a joint venture to develop and produce flat-panel liquid crystal displays. This major European initiative comes only a few days after the formation of a U.S. consortium to promote this technology. The objective on both sides of the Atlantic is not to be outdistanced by the Japanese electronics giants.

Flat-panel liquid crystal displays were invented in the United States over 30 years ago. Nevertheless, the Japanese—and Sharp in particular—are by far and away the leaders in this market of $3.5 million (18 billion French francs [Fr]), expected by specialists to boom within a few years' time. Today these so-called "active matrix" displays are used for microcomputers and pocket televisions. Tomorrow, they will reportedly invade automobile instrument panels and video telephones (picture phones), replace the cathode tubes in television sets, and become the key components of "multimedia terminals" combining computer and video functions.

According to BUSINESS WEEK, the Japanese have already invested $3 billion to maintain their leadership position and conserve their five-year lead in the very complex mastery of the industrial process. They may try harder still. Canon is said to have spent $145 million this year on the development of its production plant. Sharp has reportedly decided to spend $900 million between now and the end of 1993. "For their Western competitors, failing to respond would have meant letting themselves be definitively outdistanced," according to a specialist. "It was now or never."

With their share of the world flat-panel display market reduced to 5 percent, according to THE WASHINGTON POST, a dozen U.S. companies, including AT&T and Xerox, recently announced the formation of a consortium in the hope of regaining lost ground. They will receive support from the federal Defense Advanced Research Projects Agency (DARPA), which plans to devote around $12 million a year to the effort. "U.S. microcomputer manufacturers like Apple or even IBM—despite its joint venture with Toshiba—do not want to depend exclusively on their Japanese suppliers for components," one expert says. "The argument holds true for European television manufacturers."

Helter-Skelter

Until now, European manufacturers have advanced helter-skelter. In October 1991, the Dutch multinational Philips announced the biggest effort, calling for the investment of around Fr1 billion in two production units at Eindhoven. The first unit already employs 450 people in fabrication process development. The second, under construction, will begin mass production of 2.8- to 14-inch screens (diagonal measurement) in mid-1993. In 1988 SAGEM, whose primary interest is in automobile parts and telephone terminals, joined with CNET [National Telecommunications Research Center], France Telecom's research center, to form the Planecran consortium. Lastly, TCE and Sextant Avionique have established a research center, Thomson LCD, which has been producing around 100 flat-panel displays a year for aircraft instrument boards since 1990.

The agreement signed Thursday, 26 November, will bring order to these initiatives. It provides for the establishment of a joint venture as of 1 January. Philips will hold an 80-percent interest and the two French

firms, 10 percent each (the amount of the capital was not specified). The three groups will bring their know-how in the development, production, and marketing of flat-panel displays to this new entity, which will have the exclusive license for the CNET technology. At the same time, Philips will acquire a 10-percent stake in Thomson LCD. With the support of the European Community, research, which is not a part of this first agreement, should soon constitute the second aspect of this three-way European alliance.

France: Simulog Buys Into Connexite

93WS0184A Paris PRODUCTIQUE/AFFAIRES in French 15 Dec 92 p 1

[Article: "Simulog Acquires Stake in Connexite"]

[Text] Pursuant to its policy of teaming up with companies whose activities present a significant synergy with its own, Simulog has announced its acquisition of a stake in the Connexite company. Connexite was formed in 1992 with support from the INRIA [National Institute for Research on Data Processing and Automation]. Basing its approach on the technology developed during its participation in two successive projects under the European ESPRIT program—the GIPE [Generation of Interactive Programming Environment] and GIPE 2 projects covering a number of new technologies in the field of programming environments, with application mainly to the use of paralleled computers—Connexite aims to develop and commercialize software products designed to help in the development of applications, and in the management of large libraries, particularly for the Fortran language. The founders of the Sophia Antipolis-based company decided initially to focus their company's activity mainly on adapting the Fortran code's operating modes to the current needs of the users of scientific data processing, and to the evolution of computers toward parallelism. As of now, Connexite already markets two softwares packages: Foresys (Fortran Engineering System), is a set of tools and services designed for the development, maintenance, and evolvement of programs written in Fortran, yielding substantial gains in productivity and quality. Very user-friendly, multi-user, and operating under UNIX, this software conforms to the client/server model, and operates on the principal platforms in use in industry. Partita is a system dedicated to automatic and/or Fortran-aided paralleling. Simulog deploys its activities among the three distinct and complementary domains of modeling, data processing techniques, and digital techniques. The users targeted by the products and services developed by Simulog are in the scientific data processing sector, and from this standpoint are foremost among those interested also in what Connexite has to offer. The complementarity between the specialties of the two partners can therefore be expected to result in a gain for their clients, in terms of time and productivity. "Knowledge of the needs of users involved in modeling and computer-intensive simulation as well as in the mastery of the new data processing technologies, such as distributed or heterogeneous environments, or parallelism—possessed equally by the engineers of Simulog and Connexite—enables the two companies to offer high-performance and easily implemented solutions," says Christian Saguez, general manager of Simulog. "This new joint venture is part of the process on which we embarked with our acquisition of a stake in Noesis, a leading start-up company in image-analysis processing, and the exclusive distribution agreement we have signed with Wavefront Technologies, an American company specializing in the development of display and 3-D graphic animation softwares."

Simulog (Christian Saguez, general manager) - 1 rue James Joule, 78182 St Quentin en Yvelines. Tel. (1).30.12.27.00. Connexite (Dominique Clement) - BP 37, 06901 Sophia Antipolis cedex. Tel. 92.94.23.50.

France's Dassault, SAGEM Expand Collaboration

93WS0209A Paris PRODUCTIQUE/AFFAIRES in French 20 Dec 92 pp 3, 4

[Unattributed article: "Multiple Agreements Between Dassault Electronique and SAGEM"]

[Text] Dassault Electronique and SAGEM have signed a framework agreement broadening their sphere of cooperation to airborne computers for weapons systems, military robotics, and civilian anti-ground-collision systems. SAGEM's October acquisition of an 8-percent stake in Dassault Electronique makes it the reference shareholder of the company, which is 60-percent controlled by Dassault Industrie. The two groups have been cooperating on the weapons systems control computers for the Leclerc tanks for several years and on infrared and electromagnetic-wave missile guidance systems since May. Consultations between the two companies will continue with a view to a possible broadening of their cooperation from a European perspective. Is this a covert advance from Dassault Electronique, which is perhaps not opposed to SAGEM increasing its holdings?

Sweden: ABB Buys Esab Robotics Division

93WS0209B Paris PRODUCTIQUE/AFFAIRES in French 20 Dec 92 p 5

[Unattributed article: "ABB Takes Over Esab's Welding Robotics Division"]

[Text] The Swiss-Swedish group Asea Brown Boveri [ABB] recently took over the arc-welding robotics division of Sweden's Esab. The units acquired, located in Sweden, Germany, and the United States, have annual revenues of $80 million and employ 300 workers. This acquisition will increase ABB Robotics' annual sales by 30 percent to $450 million and should place the group in a leadership position in this field in Europe and North America. The main customers for robotized arc-welding systems are the auto industry, its subcontractors, and the metallurgical industries. ABB Robotics and Esab have worked together since 1974 in developing the market for

robotized arc welding. Esab has installed around 5,000 ABB-designed robots, mainly in Europe and North America. To date, the two companies have maintained separate production, R&D, sales, and service organizations in this market. Robotized arc welding represents about 40 percent of the growing world robotics market.

German Aerospace Subsidiary Rejects Joint Venture With Rolls Royce

93MI0211 Bonn DIE WELT in German 27 Nov 92 p 16

[Text] MTU [Engine and Turbine Union], which belongs to German Aerospace (DASA), wants to rely solely on the assistance of its American joint venture partner, Pratt & Whitney, in developing and building engines for regional and executive aircraft (in the 14,000 to 22,000 pound thrust range). This means that the negotiations on coproduction that were also being held with engine manufacturer BMW Rolls-Royce have no chance of success. DASA chief Juergen E. Schrempp announced the rejection of the Anglo-German joint venture at an assembly of employees held yesterday in Ottobrunn. He asked the entire DASA staff the rhetorical question: "Do you seriously believe that we would sell MTU or even give a majority holding to a newcomer in the field, who is just setting out to develop a new unit for middle-market engines?" An alliance could now be forged between MTU and BMW Rolls Royce only if the "newcomer" were to be satisfied with the role of "junior partner." But BMW chief Eberhard von Kuenheim had already excluded any such arrangement beforehand.

In the meantime, DASA's position in its negotiations with Amsterdam-based Fokker NV is "promising." The contract might still be signed before the end of 1992, or in January 1993 at the latest, Hartmut Mehdorn, DASA board member and managing director German Aerospace Airbus GmbH, Hamburg, told Hamburg economics correspondents. DASA would clearly take over the business management of Fokker and have both a majority on the board of directors and the right to control its financial management.

According to Hartmut Mehdorn, it had been agreed that the Dutch state would withdraw from its interests in Fokker within three years. Once DASA had absorbed Fokker, it would become a European concern.

France: Sogepa Takes Over Dassault, Aerospatiale

93MI0240 Bonn DIE WELT in German 28 Dec 92 p 15

[Text] The intention behind the move is obvious. Once the United States, Germany, and Britain had restructured their aircraft manufacturing capacities for the 21st century through mergers and rationalizations centering on Lockheed, DASA [German Aerospace], and British Aerospace (BAe), a similar shake-up in France could wait no longer.

The merger between Aerospatiale, with 1991 revenue totaling 48.6 billion French francs [Fr], and Dassault Aviation with Fr4.3 billion, seemed an anachronistic solution in view of the world crisis in the industry with its massive and increasingly tough competition. Though several critics of the merger that has now been completed between the two companies object that the union between civil and military aviation companies makes no short-term sense in terms of either costs or sales, it does however form the first stage of a structural reform that will, without doubt, subsequently go further.

French Defense Minister Pierre Joxe has thus succeeded where three of his predecessors in three different governments failed between 1977 and 1990. Unlike former Prime Minister Edith Cresson's gamble with the electronics industry, Joxe achieved his goal through careful, though tough, negotiations. The negotiations were veiled in total secrecy up to the last moment: There were no "targeted leaks" that Aerospatiale President Louis Gallois and Serge Dassault had reached agreement back in September 1992 on the terms of the merger just announced.

Under the agreement, the French government, which has to date held a 46 percent stake in Dassault (with 55 percent of voting rights), and whose direct and indirect stakes have given it almost 80 percent control of Aerospatiale, will transfer its interests to the holding company Sogepa, which will control both aircraft manufacturers in the future.

Gallois becomes chairman and Dassault deputy chairman of Sogepa: Each chief executive will represent the holding company on the other company's board. Aerospatiale and Dassault Aviation will each supply three directors to serve on Sogepa's "Strategic Committee," which will be chaired in rotation and oversee all research and development, procurement, and marketing issues. For new projects, the committee may also seek the advice and active involvement of other French aviation companies, such as the aircraft engine manufacturer SNECMA, or the weapons and electronics firms Thomson-CSF and Matra.

Joxe had a particular carrot to offer Dassault: His agreement to merge with Aerospatiale would be rewarded with approval for the "Rafale" fighter to go into series production to the tune of Fr170 billion.

Philips, Thomson, Sagem Create Active Matrix LCD Venture

93BR0251 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 3 Dec 92 p 8

[Article by Florence Ladouce: "Liquid Crystal Displays: Philips Mobilizes Thomson and Sagem"]

[Text] The Dutch firm and the two French firms form a joint venture for mass production of active matrix liquid crystal displays [LCDs], the initial European counterattack against Japanese supremacy. The door is not closed to other European firms.

Its creation will have lasted more than a year, but this time the European active matrix LCD screen center is indeed on its feet, ready to counter Japanese supremacy. Last week, Philips issued a release proclaiming the signing of a final agreement with Thomson Consumer Electronics [TCE] and Sagem for the formation of a joint venture in this field. The new entity, whose activities should start 1 January 1993 and whose capital has not yet been announced, will be held 80 percent by Philips, the two French firms sharing equally the 20 percent remaining. The company will produce active matrix LCD screens at Philips in Eindhoven, where the Dutch firm programmed, in October 1991, a 600 million French franc [Fr] investment.

In addition, the active matrix LCD screen technology (TFT [thin film technology] with only two masking steps) developed by Planecran, the French GIE [Economic Interest Group] involving CNET [National Center for Telecommunications Studies] and Sagem, will also be transferred to the new firm on an exclusive basis, while Philips will assume a 10-percent stake in Thomson-LCD, the joint subsidiary of TCE and Sextant Avionique which is today slated for the development and small scale production of screens.

Rather than working alone with their own technologies, the three European firms have thus decided to make a common cause by combining their respective know-how in marketing, development, production, and sales. Indeed, the news is a surprise for no one: Discussions had been going on for months, more specifically since Philips had announced its decision to invest Fr600 million to set up a mass production unit at its domain in Holland, where it already has a pilot line. Philips then stated that it was ready to take on partners. In April, the three firms signed a memorandum of intent.

Prototypes Expected Mid-1993

All analysts are unanimous: The world active matrix LCD market is going to explode. This component is now even considered as strategic for the future of "major" sectors such as consumer electronics, including television (direct vision and projection), computers, automotive, and videophones. The problem is that these screens require very heavy investments.

By entering into a joint venture, Philips, Thomson, and Sagem will share the costs. The formation of the new firm was one of the conditions "sine qua non" for which Brussels [EC authorities] "puts its hand in its wallet." The result: Although the three firms have not pooled their research activities, they are participating alongside universities and other European firms (GEC [General Electricity Company], Merck, Corning Europe, and others) in a new LCD research consortium (ESPRIT III [European Strategic Program for R&D in Information Technologies]) supported to the level of ECU22 million by the EC. It should be noted that the participation of the various parties in the consortium bears no relation to the distribution of the capital in the new company, which may change moreover. "Philips intends to retain the majority but is open to an increase in the shares of Thomson and Sagem, as well as to taking on new partners; discussions are going on with several European firms," points out Mr. Van Alphen, R&D director and director of LCD activity at Philips.

Initially, the production of screens with a diagonal of between 2.8 and 14 inches will be based on Philips's active matrix diode technology. Prototypes are expected by mid-1993, and mass production will start "later in the year" (Philips declines to disclose its plant's production capacity). Although, with their own requirements, the three partners will have grist for their production mill, they have the "firm intention" to tackle the broad market (no details are provided in this regard). As to the joint venture's future plan with regard to technological choices, it is too early to hypothesize. Planecran's technology is part of a basket, and if Philips has invested in Thomson-LCD, "it is also because Thomson has very interesting plans in its cupboards," Mr. Van Alphen points out.

Liechtenstein Balzers Takes Over French Solems's Flat Screen Activities

93BR0314 Paris ELECTRONIQUE INTERNATIONAL HEBDO IN French 17 Dec 92 p 4

[Article signed F.L.: "Flat Screens: Balzers Takes Over Solems' Equipment Activity"]

[Text] A new chapter opens in the eventful story of the Solems company, French specialist in amorphous silicon photovoltaic cells, a subsidiary of the Total group. Part of its activities—the development of thin-film deposition equipment and processes—has just been taken over by the Liechtenstein Balzers group, a specialist in deposition equipment and optical thin-film deposition equipment. Through this purchase (for an undisclosed amount), which includes Solems's know-how, patents, and its Palaiseau laboratory (staff of seven) in this field of activity, Balzers intends to take the lead in the field of equipment for producing flat screens, a sector for which it already supplies transparent conducting layers (ITO [indium tin oxide] layers). It has set up Display Technology, a division that will develop, manufacture, and market thin-film deposition equipment based on Solems's PECVD [plasma-enhanced chemical vapor deposition] plasma technology and used to produce active-matrix flat screens.

This equipment was originally developed for solar cells, precisely to the requirements of Phototronics Solar Technik, a company that mass-produces photovoltaic panels. It was established on a 50/50 basis by Total and MBB [Messerschmitt-Boelkow-Blohm] in 1988; Total has just recently sold its share to its German partner. According to Balzers, using this technology to produce displays would significantly reduce production costs, especially by increasing productivity through a reduction in cleaning time. In addition to Phototronics Solar

Technik, Planecran and Thomson-LCD already use Solems's design equipment manufactured by the Grenoble company Nextral. The Solems-Balzers agreement does not call into question Solems's license transfer to Nextral. Nextral will be able to continue manufacturing this type of development machines, while Balzers will be responsible for mass production equipment. Is the future for the rest of Solems's activities—solar cells—threatened? Focusing on the manufacture of customized power supply subsystems, Solems achieves a turnover of less than 5 million French francs in this area. It is obvious, anyway, that Total is turning away from photovoltaic cell technology.

French, Italian Companies Merge IC Prototyping Activities

93BR0367 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 14 Jan 93 p 15

[Article by Laurence Mizrahi: "Lithos Refocuses on Prototypes"]

[Text] Following its bankruptcy petition and its takeover by an Italian company, the Breton manufacturer of printed circuit boards will henceforth focus on prototypes only, leaving mass production to its transalpine shareholder.

The Lithos company, based at La Guerche-de-Bretagne in Ile-et-Vilaine is specializing in the manufacture of multilayer printed circuits (1992 turnover of 13 billion French francs [Fr]). It has just been taken over by the Italian FCE company (150 people, 1991 turnover of Fr140 billion) based in the Turin region. The Italian acquired a 63-percent share of Lithos one year after it had filed its bankruptcy petition.

For Jean-Pierre Le Cheviller, the director and founder of the small Breton company, the reasons for the slip-up are clear, namely "management errors together with switching the manufacturing process over to medium-scale production which was beyond the capabilities of the production apparatus." Right in the middle of a slump, J.-P. Le Cheviller has nevertheless decided not to give up. "Our suppliers, like our clients, have continued to put their trust in us even after the filing of our petition, which proved to us that the company was still viable." His recovery plan consisted of three main points, i.e., reduce the workforce (from 45 people in 1990 to 17 at present); refocus activities on prototypes; and, above all, look for a partner, which has just been found in the FCE company.

Opening in the Italian Market

According to the two companies' respective directors, this "partnership" should strengthen the position of both companies by enabling them to offer a more complete service, ranging from prototypes to mass production, while each one can stick to its own speciality. "This cooperation between both companies will be very advantageous for customers, because this will forestall some of the problems encountered at manufacturing, namely when prototypes were designed, without the manufacturer's opinion being asked, by specialists with no knowledge of printed circuit board production processes," stated A. Pautasso, FCE's chairman and managing director, who admitted that this lack of coordination gave rise to high increases in costs for the customers.

This association should also enable them to reduce their production costs by pooling some of their equipment. Finally, the two companies count on this partnership to make themselves known beyond their respective frontiers.

CORPORATE STRATEGIES

French Aeronautics Industry in Upheaval

Companies Respond to Budget Cuts

93WS0110A Paris LE MONDE in French 4 Nov 92 p 29

[Article by Marie-Claude Betbeder: "Headwinds in Toulouse"]

[Text]

Subcontractors Are the First Victims of the Crisis

Ariane, Airbus and Hermes have turned Toulouse into a major aeronautics center, while the Midi-Pyrenees region is second largest after Ile-de-France in France's aeronautics and space industries.

But it is difficult to tally exact employment figures. Based on those provided by the Regional Economic Observatory (INSEE), General Pierre Allegria, appointed as project leader by the president of the regional council, draws a distinction between two types of enterprises: about 20 major ones—builders or subcontractors at the highest level such as Aerospatiale or Latecoere which employ 16,000 people. A second group is composed of smaller subcontractors devoting 30-40 percent of their combined activity to aeronautics. They number about 230 and their employees are also estimated at about 16,000. Other sources—GIFAS [Group of French Aeronautic and Space Industries] and the regional chamber of commerce and industry (CRCI)—show different manpower figures. But these contradictions also reveal to what extent aeronautics has become "diluted" into the local industrial mix.

These contradictory figures also speak to the enormous importance assumed by small enterprises in a sector formerly composed essentially of large companies. During the first half of the 1980s, industrial groups expanded non-stop, entrusting a growing part of their activities to subcontractors. Limited at first to such activities as janitorial or guard services, the practice has increasingly reached all sectors of the enterprises as soon as a work overload arose at any time.

Companies like Aerospatiale or Dassault even subcontracted some of the "noble" aspects of their activity, entrusting full responsibility for certain parts or subassemblies to certain enterprises henceforth to be known as "partners." Thus Latecoere is responsible—as one example among many—"for the upper forward portion of section T 15 of Airbus A330 and A340" and for "the study, development, industrialization, and production, with amortized risk financing for 600 planes." Three levels of subcontracting have thus emerged: "partners," who must accept their share of industrial risk, but who cannot be stripped of the work accepted in this way; they only have to suffer the same production slowdowns as their prime contractors when there is a crisis. Subcontractors of second and third categories, for their part, negotiate on limited markets, case by case and without long-term commitments; and they see these markets disappear more or less radically when the contractors' workload dwindles.

While aeronautics in the Midi-Pyrenees area has little military-type production, there is still enough of it there to feel the effects of reductions in weapons expenditures. At the same time, Airbus and the ATR (regional transport planes), in spite of their success, are feeling the gloom of the airlines on the rebound. By one GIFAS estimate, the area thus stands to lose about 8,000 jobs in this sector (3,000 direct and 5,000 indirect jobs) between now and the end of 1994.

Chain Reaction Recoveries

Aerospatiale should not be too badly affected, thanks to what is coyly known as "repatriation of orders," that is, recuperation of work distributed among subcontractors. But for the latter, the doldrums are turning into collapse. And since some of them have gotten used to subcontracting in turn, the portion of the market entrusted to them, we are witnessing a sort of cascade effect: chain reaction reassignments which are weakening the whole PMI (small and medium-sized enterprises) fabric, from one to the next. Serge Dubosc, of the economic action department of the CRCI, says that "nearly all subcontractors are currently experiencing financial difficulties." Filing for bankruptcy, layoffs, stagnation of the essential training programs in a cutting-edge field, all this adds up to an ongoing dislocation of one of the region's principal economic "tools."

To be sure, any subcontractor knows he must diversify his markets. But many of them have trouble doing so, and diversification is not a cure-all. Thus SOCATA in Tarbes, which had tried to spread its activity in about equal parts between military aviation, helicopter construction, Airbus subcontracting, and its own fabrication projects, is now discovering that none of these sectors is in a position to compensate for the negative status of the others. The fact is that subcontracting is in crisis in all areas of industry: automotive, nuclear, oil prospecting, rail production... Survival now rests with developing one's own production; for example one of these subcontractors might now be found producing the beverage dispensers found on planes. But the majority of them are handicapped by their lack of commercial experience.

In 1989, the regional council and the CRCI founded a technical group for aeronautics subcontracting, whose goal was to contribute to the subcontractors' adaptation to the new requirements of prime contractors. Several operations were thus organized dealing with production management and with quality in particular. Currently, the group is working on closer contact among enterprises. Various initiatives are underway to ease the search for foreign markets. But all this does not appear as adequate response to the scope of the problem. A whole set of practices needs to be formulated between prime contractors and their subcontractors, so that each level stops passing its production headaches on to the next smaller link in the chain.

Economic disorder reappears in social relationships: aggressiveness is often sharp at employer functions among small subcontractors who feel like "sheep being shorn on the hoof" and their prime contractors. At Aerospatiale, peace prevails thanks to job stability and established social benefits. According to Philippe Pinel and Michel Ferbeyre, two executives at CFDT, "the social problems that prime contractors had 20 years ago have been passed on to subcontractors." This is where unions have the hardest time getting a foothold and where layoffs occur without any discussion.

On 15 October, the following statement was read during the meeting of the central enterprise committee of the Aerospatiale group: "The elected officials and union representatives of the FO, CFE/DGC and CFTC are categorically opposed to any political measure dealing with work and revenue sharing." CFDT for its part is in favor of a proportional work reduction formula among contractors and subcontractors. But it can only proceed cautiously.

Alain Lecanu, central DFE/CGC union delegate to Aerospatiale, said that "we are all torn. For years, management explained to us how subcontracting was a necessary evil since it was better to do that than to hire people who could not be kept on during later and leaner times. Today, no salaried employee among us would tolerate seeing layoffs while work remains scattered among subcontractors. But when you see the same problem through the eyes of the regional union official, you have to concede that this system does no more than shuffle employment problems around."

Dassault Discusses Restructuring

93WS0110B Paris LE MONDE in French 4 Nov 92 p 29

[Article by Catherine Leroy: "Dassault's Future"]

[Text]

Proceeding With Restructuring and Planning for Retraining

Pierre Chouzenoux, director general of public and personnel relations at Dassault Aviation, told us with some

relief that "we are approaching the end of the restructuring process." Since 1987, along with advancing technology and receding orders, social programs have succeeded each other at a fearsome pace. Manpower figures have dropped from nearly 16,000 in 1986 to a little less than 11,000 at the end of 1992.

The aeronautics construction firm began by rationalizing the production sector. To face this period of austerity, plant employment rolls were reduced. Today there are only eight specialized units left, each one in a field of its own. But since 1990, according to Chouzenoux's assurances, this sector has been left alone. On the other hand, other revision plans have beencreated elsewhere: in 1991, restructuring of the development sector, a victim in some sense of the CFAO (computer-aided manufacturing) concept; in 1992, rationalization of the sales and after-sales sectors; finally, for 1993, a new restructuring plan foresees the elimination of 841 jobs in the design and testing, equipment, and general administration sectors. A central enterprise committee was to have been established for this purpose this Tuesday, 3 November.

In the wood-panelled Champs Elysees headquarters in Paris, the atmosphere is rather confident. Steps have been taken to prepare the company to get through some difficult years. There is talk of better days around 1995. Meanwhile, the main thing is to hang on and above all to prepare for recovery by orienting salaried employees toward the jobs of the future. A real effort is being made in this sense, as acknowledged by Dassault CFDT in spite of its rather critical attitude toward management. Jean-Claude Comet, CFDT president of Dassault's central job-training committee, said that "with the instituting of a training office about three years ago, we have felt that an attempt was being made to professionalize training."

Several mechanisms have been developed to ease this development. Thus management created the Dassault trades conservatory, which aims to preserve endangered skills. Early retirements were threatening a loss of know-how, and the diminished practice of certain job skills could purely and simply lead to their disappearance, which could have been dangerous for the future. During this non-hiring period, the conservatory's mission is to organize job retraining. Good in-house professionals, who in addition have been trained as instructors, spend some time as facilitators before returning to their own jobs.

Maximum Qualification

Two years ago, management formed a preventive unit for trades and skills. It has undertaken to chart these trades and skills by sector. An inventory of typical jobs has been drawn up. Trades have been categorized by professional affinities. With this as a starting-point, a probability analysis of the most classic sort was begun. Within each sector, based on the outlook for technological development and company activity goals, the skills and jobs which will be needed in a few years are determined; quantitative and qualitative discrepancies are measured between the current situation and upcoming needs. This makes it possible to target training, professional or geographic mobility, career moves, and recruiting when there is any. "There isn't any in production any more, but there is still some, though certainly less than there used to be, in the design sector, where 40 percent of the engineers have less than four years of seniority," according to Chouzenoux.

Until 1991, Dassault was hiring an average of 300 BTS and engineers per year. In 1992, its recruiting dropped to 60 and should stay at the same level during next year before taking off again, perhaps the following year. CFDT would have liked as an end result, the establishment of a joint oversight committee to monitor trades and participate in studying job redefinition, insuring better efficiency in retraining. Management is not in favor of this, deeming that this activity is the responsibility of higher management, and pointing out that CFDT is the only union to have made such a request.

Along with manpower reduction, management also has taken steps so that internal reassignments go hand in hand with the job retraining that takes into account future skill-analysis projections. A major effort has been made with respect to salaried employees whose specialties are likely to be changed in the future; for them, Dassault has set up complementary training. For others whose skills were bound to disappear, training programs were organized, focused on adaptation, total immersion, or reconversion to productive job skills. These programs have accounted for 20 percent of the training budget (Dassault devotes 4.5 percent of its payroll to training). "In every case, there have been more qualifications," Chouzenoux insists. And finally, in January 1992, management permanently installed in each plant a counseling facility where each employee can examine skills, get information about training, about available jobs, and organize some internal or external mobility.

Is everything ready to take off? Management has gambled on maximum qualification. According to CFDT, this has been at the risk of manpower shortages in the event of recovery. Within 10 years, the proportion of shop personnel has gone from 30 percent to 10 percent of the work force, while skilled technicians have gone from 28 percent to 34 percent and engineers from 25 percent to 40 percent.

"A big head on a small body." This, according to Lucien Vicaire, central CFE-CGC union delegate, is the ideal profile for Dassault. He asserts that "we are moving more and more toward sharply defined specialization. Toward study projects. Dassault's best bet is to invent, sell its know-how, go further."

Deutsche Aerospace's Plans for Regional Aircraft Do-328

93WS0134C Duesseldorf HANDELSBLATT in German 27-28 Nov 92 p 31

[Article by BEU: "German Aerospace: Do-328 Regional Aircraft Should Be a Market Success; New Management Installed at Dornier Aviation"]

[Text] Hamburg, HANDELSBLATT 26 Nov 92—As an acting member of the board of the German Aerospace Company (DASA) in Munich and responsible for the entire Aviation Division, Hartmut Mehdorn wants to successfully place the Do-328 regional aircraft developed by Dornier Aviation, Ltd., Oberpfaffenhofen, on the market. "This program poses considerable challenges for us, but we accept them," Mehdorn emphasized at the Hamburg Economic Journalists Club.

The restructuring of the management of Dornier Aviation, Ltd., decided on by the board of directors must be viewed against this background. Effective 1 December 1992, Hansjoerg Kraenzle (55) has been appointed general manager of Dornier Aviation and, in that function, at the same time head of the DASA Regional Aircraft Product Division. He succeeds the previous management spokesman, Dr. Hans Blume, who will be responsible for coordinating aviation sales on the board of directors of the German Aerospace Aviation Division, effective 1 December 1992. As a member of the management of German Aerospace Airbus, Ltd., Hamburg, Kraenzle is currently responsible for supervision and sales.

Dieter Stempnewicz has been appointed manager of the Oberpfaffenhofen plant in the Regional Aircraft Product Division. He takes over the duties of his predecessor, Hans-Dieter Abt, who is leaving by mutual agreement on 30 November. Up to now, Stempnewicz has been employed as the manager of the Stade Airbus plant and, in Mehdorn's opinion, has won his spurs as a "cost cruncher."

In order to obtain the authorization for the regional aircraft, which they have been developing since mid-1988, as quickly as possible, that is, before the end of fall 1993, Klaus Buchholz has been acquired to assume management of development in the Regional Aircraft Product Division. Up until now, Buchholz has been designing products as head of development in the European consortium, Airbus Industry, in Toulouse.

While retaining responsibility for finances and general accounting in the Regional Aircraft Product Division, Hans-Peter Ring has been appointed manager of Dornier Aviation and is responsible for the Finance Department there. Hartmut Mehdorn has been chosen to be Dornier Aviation's head of AR. The previous head of AR, Werner Heinzmann, will continue to be chairman of the board of Dornier, Ltd., a member of AR at Dornier Aviation.

Dr. Bernd Straeter, formerly a member of the Dornier Aviation management, is to be appointed general manager of the Eurocolumbus Space Company, Ltd., Bremen, as of 1 December. When his duties as a member of the Dornier management, in which he has been responsible for sales, supervision, and special projects, come to an end, Klaus Neuhaus will in future handle special assignments.

Mehdorn pointed out to the Hamburg economic journalists that there is something wrong with the way costs are structured at Dornier Aviation, which employs 3,600 workers. With the Do-328 DASA will be moving in a market segment in which anyone in the world who can produce aircraft is busily competing. This aircraft, which is due to appear on the market in 1994—and, as a result, as Mehdorn admitted, very late—will be facing nine competitors, some of which come from low-wage countries. Mehdorn said: "As good as the product may be, there are world market prices. If you can't keep pace with them, you can't sell anything either."

Nevertheless, Mehdorn feels that they have a real chance of marketing the Do-328. They are negotiating with a number of interesting customers. They expect to deliver the first aircraft in early 1994. "I think that we'll be marketing a very quiet, very economical, maybe not so cheap, but still affordable aircraft." Mehdorn sees opportunities for the Do-328 with its 33 seats in Europe and the United States as a feeder plane in regional and transnational traffic.

"We're very optimistic that we'll be successful, even though we know that we've got a lot of work to do to get our prices down and make our structures cheaper." They will have to make use of the experience accumulated with Airbus to lower costs at Dornier Aviation. After years of struggling, Airbus is today in all respects comparable with the U.S. competition as regards production costs. "I'll be optimistic if we succeed in transferring this potential to Dornier. Then we certainly won't get rich with this business, but we will have fun doing it and we'll be making enough money to safeguard continued development."

Germany: BMW's Diversification Strategy Discussed

93MI0234 Bonn DIE WELT in German 18 Dec 92 p 14

[Article by Ulrich Friese: "BMW Pursues a Step-by-Step Policy—Car Manufacturer Diversifying From Core Business Into Software, Aeroengines, and Mobile Phones"]

[Text] There are few signs in Munich of the recession that has hit the German automobile industry. The success of Bavarian prestige car manufacturer BMW in fighting off the downward trend with stepped-up production and sales is traced by Financial Director Volker Doppelfeld to a wise corporate policy: "We've concentrated more than other firms on our core business."

Whereas Daimler-Benz has expanded rapidly beyond cars into electronics (AEG) and aerospace (German Aerospace), BMW has constantly pursued a step-by-step diversification policy. Chief strategist Doppelfeld summarizes his company's principle as follows: "We only invest in new areas if they are related to our core business."

BMW's straight-forward range of holdings now includes the high-tech firm Kontron, the software supplier Softlab, a majority stake in aircraft engine manufacturer BMW Royce to Royce, and a 31-percent shareholding in Loewe-Opta. In addition, as leader of a consortium bidding for the Bundespost E-1 network, BMW is making its latest attempt to gain a foothold in the mobile phone market.

According to Doppelfeld, "every one of our subsidiaries has to be viable on its own account, not just operate as a specialist outpost dependent on the parent company." This corporate philosophy has recently been made clear to Kontron, which was taken over three years ago by the Hoffmann-La Roche chemicals company. In 1991 Kontron, which serves a niche market in systems analysis, image processing, and metrology, achieved sales of only 260 million German marks [DM], and made an overall loss of almost DM100 million. This crisis, caused by errors of judgement at management level, forced the head office to take drastic measures: By mid-1993, Kontron will have to cut 400 of the 900 jobs that it provided in 1991, raise sales to DM300 million, achieve profitability by the end of the year, says Doppelfeld.

Doppelfeld is noncommittal about BMW's long-term involvement in Loewe Opta, in view of its major emphasis on entertainment electronics, which accounts for 70 percent of its sales, in contrast to only 20 percent in telecommunications and 10 percent in automobile electronics. He states: "We shall decide whether or not to remain together once the management has submitted its long-term plan."

Expansion in software, aircraft engines, and mobile phones forms the core of BMW's diversification strategy. BMW's recent takeover of Softlab in Munich gave a clear signal of its intention to gain access to the renowned software supplier's technical lead and longstanding commercial success (sales: DM146 million). The future course of this involvement still has to be set, however.

Softlab needs to acquire a presence in the American market with its high growth potential if it is to gain a leading position on the market for CASE [computer-aided software engineering] products—software tools for developing computer programs. Doppelfeld describes his priority as follows: "We are looking for a company with a product range complementary to Softlab's and a strong distribution network." If no suitable American candidate emerges, the solution could be to collaborate with one or more partners.

BMW's move into aircraft engines is "genuine" diversification, Doppelfeld stresses, despite the emotional undertones to this return to BMW's original business roots as an aircraft engine manufacturer. The areas of synergy that have emerged between aircraft engines and BMW's core business have proved "far greater than originally supposed," and the benefits for both sectors include know-how transfer in materials technology, mass production and electronic engine control systems.

The joint venture company established by BMW and Royce to Royce Plc benefits not only from the renowned British aircraft engine manufacturer's know-how. "Besides having taken over the maintenance contracts of KHD Aviation Engineering, we are involved in Royce to Royce's day-to-day business," says Doppelfeld, referring to the various pillars of BMW Royce to Royce GmbH (BRR) business at Oberursel.

BRR plans to achieve its longterm target, which is to increase its DM231-million 1991 sales figure to over DM1 billion, through sales of a new range of aircraft engines (thrust range from 14,000 to 22,000 pounds) for small and medium-sized executive aircraft. BRR's work on this ambitious project, in which around DM1.3 billion have been invested, is proceeding "at full throttle and with no effort spared," states Doppelfeld, countering rumors in the industry that the site at Dahlewitz, Berlin, planned for the second factory is up for sale.

The corporate strategist says that BRR is gearing up to face "tough world competition." There is certainly little room left in the capital-intensive aircraft market, which is already occupied by the three main players, General Electric, UTC subsidiary Pratt & Whitney, and BMW's partner, Royce to Royce. The possibility of joint work on specific projects was explored with BRR's German competitor MTU [Engine and Turbine Union], but there are currently no prospects on that front, according to Doppelfeld: "We intend, come what may, to retain control over the development and production of the new generation of medium-range aircraft engines as a prerequisite for the continuation of the project."

This also serves as a reply to recent statements by Daimler-Benz subsidiary MTU that control could "in certain circumstances" be shared with BRR. Doppelfeld retorts that, "the pressure that an order from Gulfstream has placed on our engine development timeframe allows for no more flirting."

Peripheral Business

BMW Group: Sales revenue for 1992 estimated at approximately DM31 billion:

Mobile Phones

—Axicon GmbH (100-percent owned by BMW) Bid for E-1 network ("E-Star")

Software

—Softlab GmbH (100-percent owned by BMW) Aircraft Engines BMW Royce to Royce GmbH (BMW stake: 50.5 percent)

Electronics

—Kontron Electronics (100-percent owned by BMW) Loewe Opta (BMW stake: approximately 31 percent)

Start-Up of Thomson Broadband Systems Company 'Successful'

93BR0290 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 10 Dec 92 p 13

[Article signed Y.A.: "Thomson Broadband Systems: Real Launch After a False Start"]

[Text] The first "real" civilian subsidiary of the Thomson-CSF group was set up in Brest in less than a year with

a view to breaking into the videocommunications networks and multiservices markets.

"We may be swimming against the tide in the short term, but we will soon be in perfect tune with the market," said Marc Veron, managing director of Thomson Broadband Systems [TBS], Thomson CSF's first subsidiary entirely devoted to a civilian activity. A reference to where this young firm is positioning itself—videocommunications networks and multiservices markets—and to past setbacks in the French "Cable Plan," but also redeployment prospects offered by optical links, notably with the Fiber-to-Home concept.

Founded as a "start-up" (barely a year lapsed between the decision by Alain Gomez and the first contracts), TBS has just been handed a market worth some 200 million French francs [Fr] over a three-year period by France Telecom to supply this type of equipment for the Cable Plan's OG (all optic) networks. A good start, but above all a good reference that should help the new subsidiary to make inroads into export markets, where it has already secured a certain number of contracts. With a staff of over 70, TBS plans to employ some 170 people by 1995 if contracts "fall" as planned, and to have a turnover of some Fr250 million.

"Monomode fiber-optic cables will soon be transmitting HDTV [high-definition television] signals. There is already demand by cable operators in France and neighboring countries for 'tailor-made' systems that require a system-based approach," said TBS management, which is planning to balance its sales figure between equipment (FM [frequency-modulated] optical carrier and MABLR [broadband amplitude-modulated] stations) and services (network engineering and feasibility analyses). TBS, which has installed a production facility (CMS [surface-mounted components] line, a wave-soldering machine, testing equipment), also calls on local subcontractors (24 jobs were indirectly created in fine sheet metal work, printed circuits, and studies).

The company has, of course, benefited from the know-how of the Thomson group laboratories for the development of its own products and expertise. It will also benefit from the proximity of LER (Rennes Electronics Laboratory) and the ENIB [Brest National Engineering College] and ENSTB [Brittany College for Advanced Telecommunications Studies] engineering schools located in the same Brest Iroise technopolis as TBS. A true "false" start-up.

Netherlands: Tulip Faces 'Substantial' Loss in 1992

93BR0312 Amsterdam COMPUTABLE in Dutch 18 Dec 92 p 1

[Article by Toby Ellson and Maurice Van Uden: "Round of Sackings at Tulip Leads to Heavy Losses"]

[Text] Den Bosch—Tulip Computers is setting aside 10 million guilders for a large-scale reorganization in which 90 of its 420 work places will disappear. As a result, 1992 will end with a "considerable loss."

The disappointing developments in the European computer market, with the resulting price erosion and narrowing profit margins, are being advanced by Tulip as reasons for the current reorganization and the anticipated loss. Over the short term, the company does not anticipate a real improvement. In an earlier interview, Tulip President-Director F. Hetzenauer said that he expected a new period of substantial growth by mid-1993.

The restructuring—as it is presented by the advisers from KPMG Klynveld—has in the meantime been approved by the management/employees council. The board, however, will not disclose what the further contents of the plans are. It is not clear, therefore, what other steps the company is to take in order to achieve the necessary cost savings. The company does, however, say that the number of "indirect" jobs may be cut, such as those in the administrative, financial, and marketing departments. In this connection no exact figures are being mentioned.

Although Tulip has been able to face up to the crisis very well until now, the spokeswoman indicated that the cost reductions of 7 percent which were achieved last year—particularly in production and through the sale of property—have been found not to be enough to ensure continuity. An analyst from the Gartner Group said last week that it is possible that within a short time the company could be taken over by either a Japanese or an American concern. Although Tulip has denied this, HET FINANCIEELE DAGBLAD was already speculating last week about an acquisition by Dell Computer or by Olivetti.

The talks which Tulip has had with Wang Laboratories on the subject of worldwide supply of personal computers appear to be a "dead duck." This is because the U.S. supplier has asked for postponement of payment. For the time being it does not seem as if there will be a change in this position, so that this potential contract will not lead to an increase in revenues for Tulip, in any case not in the short term. Moreover it seems that Wang is also in discussion with other companies, so that it is uncertain how much of the expected contract could end up in the hands of the Tulip anyway.

Last year, Tulip's net results came to 16.3 million Dutch guilders, compared to 18.7 million guilders for the previous year. Over the first six months, however, the results showed a dramatic decline. The net profit dropped from 8.2 million guilders to 5.3 million. However, this did include an extraordinary benefit of 3.5 million guilders from the sale of the Compudata subsidiary. The gross margin dropped from 39.5 percent in 1991 to 35 percent.

Siemens-Nixdorf's Investments in Eastern Germany Outlined

93BR0336 Rijswijk POLYTECHNISCH WEEKBLAD in Dutch 17 Dec 92 p 2

[Article by Nico Baaijens: "Computer Giant Siemens-Nixdorf Smells Business in Eastern Europe"]

[Text] Last year, the German computer manufacturer Siemens-Nixdorf (SNI) invested many millions of [German] marks [DM] in new subsidiaries in the former GDR. So far, 13 SNI subsidiaries have already been opened in commercial and industrial centers. SNI is also preparing the establishment of sales and production centers in the former Soviet Union.

Shortly after the Berlin Wall came down and the border between East and West Germany disappeared, SNI's "quartermasters" found unspeakable chaos in the new German laender, says Klaus Kossmann, SNI manager for the eastern areas. Germany's new states are in a process of reorientation and reconstruction. It is estimated that this economic, social, and political healing process will take at least another 10 to 15 years.

SNIs and the other computer manufacturers' interest in eastern Germany is not inspired by charity. The American market researcher Diebold estimates that the market will be worth almost 3 billion [Dutch] guilders for the computer industry alone. Because the former GDR was the East block's largest industrial manufacturer, SNI had no difficulty in finding well-trained and very motivated employees. When SNI established a nationwide sales, manufacturing, and servicing network, over 8,000 applicants presented themselves. From this wealth of applicants, 600 were carefully selected; almost all of them were graduate-level engineers or high- and mid-level technicians. About 100 of them were immediately available.

Comparable Jobs

The wage level of these new employees is 80 percent of that of comparable jobs in the West. "This is very high, if measured against the GNP," says Kossmann. "For the entire Federal Republic, the per capita GNP is DM40,000. In the eastern states without Berlin, it is only DM11,000."

The growth of SNI in the eastern area is still hampered by "typical GDR situations," as Kossman puts it. Everything is inadequate, especially infrastructure and organization. The cars of many employees were therefore equipped with car phones, in order to exchange information and faxes through radio transmitters.

Despite the initial problems, SNI is confident in the future of Germany's eastern area. In part, this future will depend on developments in the CIS and the EC. In industry, SNI has contacts with banks and industrial companies such as Waggonbau AG, Takraf, Planeta, and Mias GmbH. In trade, it focuses on big companies such as Konsum, Minol, Interhotels, Mitropa, and Wand und Boden. The management policies of government institutions must also be reconsidered and new computers are required. Cooperation agreements for research and development have already been concluded with technical colleges and universities. The first thing to be done by SNI in universities is installing modern computer systems and training staff, professors, and students.

France: Airbus's 1992 Results Said to Reflect Aviation Crisis

93BR0375 Brussels LA LIBRE BELGIQUE in French 12 Jan 93 p 17

[Article by Pierre Sparaco: "Airbus Feels Full Effect of Crisis—1992 Results: 136 Orders... and 94 Cancellations"]

[Text] Airbus Industrie has drawn up a mediocre 1992 balance sheet. However, although there were more orders than in 1991 (136 aircraft, as against 101), which is almost reason enough to celebrate in these lean times, two customers in dire financial straits had to cancel orders placed before the drop in demand. Northwest Airlines canceled orders for 74 aircraft, the leasing company GPA for 20.

Consequently, simple subtraction gives a true picture of the European consortium's balance sheet. The net increase in orders amounts to just 42 aircraft—less than Boeing, but better than McDonnell Douglas. All in all, poor consolation.

Not Before 1995

Jean Pierson, managing director of Airbus Industrie, outlined the situation clearly: 1993 will not be any better and do not expect any miracles in 1994. At best, the upturn will begin in 1995. Nevertheless, the industrial consequences of this situation are not catastrophic. The Europeans are still recapturing a fair share of the world commercial aircraft market—currently 31 percent. At worst, they will simply have to slow this progress down.

Last year, the consortium delivered 157 aircraft, and plans to deliver 150 this year. This figure will later rise to 170, but not to 220 as initially forecast. The orders amassed over the past few years have been substantial and correspond to contractual commitments covering a very long period.

Under these conditions, it "suffices" to act the big shot, even though the rate of production for some models is likely to be downwardly adjusted, especially the "small" A320 and the large twin-engined A300-600 and A310.

An indirect victim of the crisis is the A319, the short, 134-seat version of the same airframe, which will not get off the ground. This new model was due to be launched last September, but this has been postponed due to a lack of initial customers.

Beneficiary

So, it is the youngest members of the Airbus family, the twin-engined A330 and the four-engined A340, which are becoming the consortium's bread and butter. These are the largest, heaviest, and therefore most expensive aircraft in the line, so orders for them should help Airbus Industrie's turnover soar to new heights.

In 1992, the consortium's revenue totaled $7.6 billion (a special dispensation allows the consortium to keep its books in U.S. currency). This figure will rise to $8.7 billion in 1993 and grow further in 1994.

Better still, the return to the black has been confirmed. Last year's profits amounted to about $260 million, divided up among the various partners according to their shareholding: 37.9 percent for France and Germany, 20 percent for the United Kingdom, and the balance for Spain. As associate members, Belgium and the Netherlands are not taken into account.

Naturally, Airbus Industrie can benefit without its partners—individually speaking—automatically getting something out of it. Everything depends on the parity of the currencies and the productivity of each partner.

Generally speaking, though, the consortium is doing well enough to enable the industrial partners to continue repaying regularly the money advanced to them by their national authorities with a view to developing the range of aircraft.

In all, they paid back some $700 million in 1992, while earmarking an extra $200 million of their equity capital to develop the A321, which is currently in its launch phase and is due to make its first flight in mid-February.

600-800 Seater

Airbus Industrie will not stop there. There has long been talk of a true airliner, the A350, a 600-seater which could theoretically be delivered by 2002. An 800-seat version is said to follow later.

Boeing has similar plans for an NLA (New Large Airplane). But there will undoubtedly be room for more than one contender. The conflict is already heating up. And nobody dares to say that it is premature, to say the least.

EAST-WEST RELATIONS

France: CNRS Finances Russian Apprenticeships at French University

93WS0157A Paris LE MONDE in French 25 Nov 92 p 13

[Article by Jacques Monin: "Russian Physics in the Languedoc"; first paragraph is LE MONDE subhead]

[Text] CNRS funding allows a series of Russian scientists to work as visiting professors for several months at the University of Montpellier, which is discovering the wealth of the Soviet school.

Montpellier—Natasha bends over her computer. She taps out a few commands on the keyboard, then glances through the laboratory window at the setting sun. She will soon be back at her seaside apartment in Palavas, only six kilometers from Montpellier. Like her husband, now employed at the Laue-Langevin Institute in Grenoble, Natasha Kirova is one of many physicists from the former Soviet Union offering their services to Western universities. Twelve of them have chosen the city of Montpellier, where they are currently settling in.

Indeed, there is a strong temptation for them to escape from an economic crisis that has not spared the universities and threatens to sterilize their research. In the absence of funding for their laboratories and any real political will, these researchers find themselves at a loss. If they are not forced to become taxi drivers or give private lessons to feed their families, they are emigrating to countries in a better position to offer them salaries they could never have dreamed of in their own land.

The University of Montpellier's physics department, which consists of around 100 scientists, understood this. "I did not want to see what happened in the 1930s, with the flight of German scientists to the United States and England, repeat itself," says Andre Neveu, project leader for the strengthening of physics at Montpellier. Backed by the successful two-year experiment of pairing the Ecole Normale Superieure [Upper Normal School (for Technical Instruction)] in Paris with the Landau Institute in Moscow and the Stelkov Institute in Saint Petersburg, he was able to convince CNRS [National Center for Scientific Research] to fund 85 months of salary for Russian researchers at the Montpellier site. This money is supplemented by 4.5 million French francs [Fr] from the funding for Mediterranean integrated programs, a sort of European reconversion fund, used in this case to strengthen physics in the Languedoc-Rousillon region. Russian researchers will be received in rotation for two- to six-month periods.

Original School of Thought

The Soviet school is proving of incalculable value for the French scientists, who often lack stimulation in the area of theory. Cut off from the Western model of mathematical thought by Communism and kept almost incommunicado, in intellectual isolation, the former Soviet Union paradoxically gave rise to an original, innovative school of thought that is more intuitive than the French model and less inclined to see physics as a branch of mathematics than in the West.

Today, the approach of these researchers from the former Soviet Union seems indispensable to the Montpellier scientists, who are anxious to develop a more interactive rapport and to set up an "institute of theory

and modeling" alongside their research on semiconductors, glasses, and complex fluids. Moreover, recruitment has been easy. The first 12 researchers also come from the Landau Institute in Moscow and the Ioffe Institute in Saint Petersburg. They were "spotted" for the most part in connection with previous "pairings" or with seminars or trips to Russia.

CNRS has offered them two- to six-month contracts at salaries of Fr20,000 to Fr25,000. This is much less than what the United States and Taiwan are offering, but France has arguments that are not always canceled by money. It is geographically closer to Russia and represents a smaller cultural break. It has a sentimental attraction strengthened by a tradition of exchanges. The scientific arguments were sometimes decisive. "I was already using Montpellier's experimental results on conductive polymers in Russia," Natasha Kirova says, "and I had a chance to join this group for six months. It was an opportunity."

Facilities had to be found for these newcomers. It was not difficult to do so, given the transfer of several University of Montpellier-II laboratories to the National Computing Center and the CNRS campus, which freed up 1,000 square meters. The next task, obtaining visas, proved much harder.

The French Temptation

The authorities seem to have become more suspicious of foreigners recently. "For these researchers, who will be in CNRS posts, we had to specify which health insurance program would cover them, complete with supporting documents," Andre Neveu says. "Recently, for a conference in Naples, the French consulate demanded we tell them the hotel where the Russian we had invited for a week would be staying."

Once in southern France, those with a wife and family will have to find their own housing—probably on the coast. Central Montpellier is saturated, and apartment owners are reluctant to rent for six-month periods. When their contracts expire, they will go back home, making way for the new arrivals. Their savings here will allow them to live decently there. Some will be able to put their work to use at a private university recently established in Moscow in an attempt to save what can be saved of the best students. The instructors occupy pre-existing university buildings, organizing courses as they like.

But the French temptation exists. Physicist Alexei Zamolodshikov, who had the luck to be named research director at Montpellier, admits that he would like to stay at least three years, long enough for his fourteen-year-old son to finish high school. Andre Neveu is aware of this appeal, but he sees it as an opportunity for French research. "We are presenting them with a temptation, it is true, but the best are presented with one anyway. So it might as well be in France."

France Hiring and Training Eastern European Researchers

Europe's Attraction

93WS0179A Paris LES ECHOS in French 15 Dec 92 pp 15-16

[Article by Isabelle Mandraud: "A Mine for French Companies; Looking for Young East European Engineers"—first two paragraphs are LES ECHOS introduction]

[Text] As they increase their operations in Eastern Europe, French companies can no longer just send expatriates there. They are now looking for younger people, more flexible and dynamic than their elders: the new generation of eastern European engineers.

Now that they have invested in facilities in Eastern Europe, French companies are going on "fishing expeditions" to find the young engineers that will eventually replace former executives. Many of these Poles, Czechs, and Hungarians already have good technical qualifications. Often, all they lack is team work practice and the habit of taking initiative, two things of which they were deprived by the former regimes. Hence the multinationals' concern to train these young engineers, and sometimes even to offer them a first job in a subsidiary before sending them back to their own countries. But although this may look fairly simple on paper, actually doing it is another thing. Bringing them over and then sending them back poses, for instance, a salary problem that is difficult to solve. Especially considering that eastern European companies know that they will eventually have to "close the salary gap" with the West. At the same time, governments and companies are still interested in the knowhow of former Soviet researchers, and want to prevent any transfer of skills to "powers" that might not put them to good use.

A wall fell, and markets opened themselves. Less than three years ago, BSN [Boussois-Souchon-Neuvesel; Gervais-Danone] had no operations in Eastern Europe. Today, the foodstuff group has taken over the leading Czech candy company, Cokoladovny (8,000 people, 15 factory) and introduced its Danone brand in Poland, Hungary, and Russia. Like most western European companies, BSN went through all possible scenarios in order to find the right people and commercially conquer these territories. First, it looked for former expatriates in its organization chart; then it asked headhunters to recruit experienced cadres; finally, in a third stage, it recruited young engineers on location. "We will soon hire 10 or so young graduates, half for sales, half for engineering," Patrick Dubert, the group's human resources manager, confirmed.

To achieve these goals, Antoine Riboud's group has taken a close interest in the Copernic program in the past three years. Back then, five young members of the Engineers College[1] wanted to do something to help their fellow engineers in Eastern Europe, as they were themselves natives of these countries. They created the

Copernic program (named after the famous Polish astronomer), found financing and contacted French companies.

Good Technical Qualifications

Objective: to invite young engineers (high school plus five years of higher education) and train them with a view to getting them hired by participating companies. "Of the first two batches, more than two-thirds were actually hired," Philippe Mahrer, head of the Engineers College, pointed out. "These young people are aged 24 to 32, possess the same technical qualifications as their French counterparts, sometimes even some job experience, and they speak French."

Daniela Ratcheva, 30, thus came straight from Bulgaria. A graduate of the Sofia technical university, working as production automation engineer in a small company, Technoinvest, she left her husband and her three-year-old son to spend 12 months in France, including five months in training. "When I arrived, I underestimated myself, but I soon felt that I could adjust. What I lacked most in Bulgaria was access to information," she said. Like most of her fellow trainees, she hopes to work for a French company wanting to invest in her country.

"These cadres interest us because of their professional level; they are on the same wavelength as managers trained in our higher schools," Jacques Beaules, the Copernic representative at the personnel department of Generale des Eaux [General Water-Supply Company], confirmed. All companies in the group are now contacting him—he was the first director of Copernic—when they are looking for eastern European managers. Of the four "Copernicians" recruited internally, one, a Pole, has already been hired by his country's Privatization Ministry. To Jacques Beaules's great satisfaction. "These are future executives who will eventually take on considerable responsibilities. They bring back contracts, and they welcome any ministers visiting our facilities," he indicated. This, by the way, is what this recruiting program is all about.

Eager to Learn

These people may therefore be the future decision-makers that these countries need so badly, but they are also acknowledged to have excellent technical qualifications. As a result, companies kill two birds with one stone. "When a western European company takes over a local company, we are asked to find the management staff, except for the technical director; that says it all!" Serge Lamielle, assistant manager of the H. Neumann International agency, commented. "We must help them work as a team, negotiate, take initiatives, but they are highly motivated," Monique Le Mai, in charge of international affairs at the CESI [Center for Higher Industrial Studies], indicated. You must see marketing and economic textbooks translated from the English selling like hot cakes at the entrance of the Moscow Exchanges to understand these young people's eagerness to learn capitalist rules.

Ten Times a Minister's Salary

For one year now, Bull has been actively looking for these well-rounded types. After Hungarians, Poles, and Czechs, 10 or so Russian engineers are expected to join Bull's staff in a few weeks. "We recruit mostly young people because they often speak English and are more flexible and more dynamic," Georges Hirsch, who was appointed human resources manager for eastern European countries in May 1991, explained. That same month, a group of data-processing companies was created (their latest meeting took place in Munich last summer) to exchange information on eastern European countries, channel competition, and agree on the salaries to be paid.

Actually there is much competition to find the best, in particular in the data-processing sector. Bull is now organizing presentations of its group at the best universities, and it has developed a training program specifically designed for these young recruits. BSN will soon do the same as far as presentations at universities are concerned. In a second stage, the group is even considering offering recruits a first job in Europe for two or three years to acclimate them before sending them back to their countries. This of course poses salary problems...

With respect to remuneration, western European companies were doing all right so far, since an eastern European engineer did not earn more than 5,000 to 6,000 French francs [Fr] [per month]. Enough at any rate—compared with average salaries—to discourage them from moonlighting, as they were used to doing. Remuneration is an endless tight-rope act. Engineers must be paid what they are worth without throwing the local market off balance. "You cannot offer an engineer 10 to 20 times a minister's salary," Pierre Laguerre, general delegate for eastern European countries at Rhone-Poulenc (which employs at least 250 young local engineers), exclaimed. But companies agree that eventually eastern European salaries will catch up; escalation has already started, especially as young people steadily become more aware of the salaries paid to their western European colleagues.

Meanwhile, companies must constantly juggle with inflation rates and the housewife's shopping basket, the only truly significant indicator. Each has its own method. BSN makes local salary surveys and Bull chose to pay the Russians in foreign currency to avoid any problems.

Not all companies, however, have made that much progress in the field of eastern European human resources. Some still chose to hire experienced cadres. But the trend is obvious. Young eastern European engineers really have the wind in their sails, and companies like Paribas are quietly revising their plans. "We must

prepare the future with the second generation, the generation that did not acquire bad habits. With privatization vouchers, we shall have an increasing need for juniors, 'technicians' capable of handling dossiers," Agnes de la Rochere, management assistant at Paribas, admitted.

Pilot Fishes

Cautious, L'Oreal, which now owns a production subsidiary in Moscow and will soon have another one in Poland, chose for the time being to achieve a "mix" of senior and junior cadres for its teams. "We will recruit young people progressively, but we also need experienced managers who know their jobs and their markets," Marcel Lafforgue, vice-president and general technical manager of the group. This being said, L'Oreal is also planning for the future; for instance, this year it hired two young Romanian engineers to work in France until it develops operations on location.

The same approach prevails at Chaffoteaux & Maury, a large PMI [small to mid-size industry] specialized in heating and air conditioning; in the past two years, it has hired a young Pole and a young Slovak. "We intend to expand into these countries a few years from now. We have therefore concluded an agreement so that they will then go back on location. Meanwhile, we are training them in our trades. With them, we are planting our first banderillas," Jean-Yves Remond, director of human resources, explained. This is an investment for the future, and these young people will be implicitly employed here as pilot fishes...

Few Hired Away

Thus, in nearly all cases, French companies recruit young eastern European engineers with the intention of eventually sending them back to their own countries. Some companies, however, include them in their domestic teams, quite simply because of the skills they contribute. This is the case of Marian Ion, a 35-year-old Romanian, a graduate from the Bucharest Polytechnic School, and R&D engineer. While spending a couple of days in France, two years ago—his first visit on the other side—he chanced upon an INRIA member [National Institute for Research on Data Processing and Automation] and gave him his resume. He stayed at the INRIA for nine months before being recruited by one of the Institute's "startups," Noesis, a company specialized in computerized image processing. "In Romania, I always lacked the means to work properly. Here, work is organized efficiently. Besides, over there, my prospects were not that great, short of opening a restaurant!" he said. Did he adjust well? "No problem," Marian Ion said with a smile, "as long as my wife was allowed to join me."

Footnotes

1. Third cycle in business administration, created by the School of Civil Engineering, the School of Mines, and the Institute for Political Studies in Paris.

Russian Brain Drain

93WS0179B Paris LES ECHOS in French 15 Dec 92 p 16

[Article by Isabelle Mandraud: "Channeling the Russian Brain Drain"—first paragraph is LES ECHOS introduction]

[Text] States, universities, and companies are showing considerable interest in researchers from the former Soviet empire. But this first requires a time-consuming identification and location process.

The brain drain from the former Soviet empire will be much talked about for some time to come. Haunted by the memory of the German brain drain under the Nazi regime, which drastically changed American research, western European companies and universities are trying to salvage the Russian researchers' knowhow for their own benefit. Of the 750,000 researchers of the former USSR, it is estimated that 30,000 scientists have left for the United States, as many for Israel, close to 4,000 for Germany, and not quite 600 for France.

"In French universities, this year, 30 percent of the mathematics professors recruited are Russian," according to Claude Bardos, mathematics professor at the Paris-VII University and at the Cachan Higher Teacher Training School. From August 1990 to June 1992, France also gave over 200 grants of variable length to CIS [Commonwealth of Independent States] researchers. The temptation is strong for the latter to flee from an unprecedented economic crisis that threatens their research and the universities, when it does not force them to moonlight in order to feed their families.

Identification

To slow down this veritable "brain drain" (toward major universities), and mostly to prevent these researchers from offering their services to unreliable countries, the EEC, the United States, and Japan have given the green light, this year, to the creation of an international center for science and technology that will help retrain scientists in peaceful activities.

Large companies, too, are keenly interested. Already in 1990, IBM developed a partnership program with all large research centers and local universities. "Companies are eager to recover these scientists' knowhow, but they do not always know how to integrate them," Sylvie Drouard, director of Science Careers and Management, commented. This joint subsidiary of Sciences and Tech and the Courtaud Group specializes in recruiting high-level scientists; it has completed about 10 missions in the USSR on behalf of French companies. The sectors most in demand are obviously space, computers, chemistry, and nuclear physics.

First objective: To identify competent scientists at universities such as Landau or Steklov in Moscow. Not to

mention the dissidents that the communist government had banished. This, for instance, was the case of a man who was found in a Siberian transformer factory... This is a painstaking process that usually ends with an invitation to these scientists to come to France for specific missions. "They come for three or four months at a time, go back, then come again. It takes time because, on both sides, people do not disclose everything for reasons of confidentiality," Sylvie Drouard explained. This second stage rarely ends in a steady job offer.

This cautious attitude is in fact dictated by essential questions. Are they reliable? Will they adjust? Are they really contributing new knowledge? For the time being, these questions remain unanswered, as it will obviously take a very long time to assess the results.

Principal Eastern European Higher Technical and Economic Schools

Hungary	Budapest Economic Sciences University
	Budapest Polytechnic University (consisting of six faculties such as mechanics, electricity, data-processing, etc.)
Poland	Warsaw, Krakow, Poznan, Katowice, and Breslau economic academies
	Gdansk, Gleiwitz, Krakow, and Poznan technical universities
	Four business schools in Warsaw
Romania	Bucharest university (16 faculties, mathematics, physics, chemistry, etc.)
	Bucharest and Timisoara Polytechnic Institutes
	Bucharest Academy of Economic Sciences (seven faculties)
	Iroma, the Romanian Institute of Management
Russia	Moscow Commercial Institute (four departments)
	Business school at the Moscow International Relations Institute
	Moscow and Saint Petersburg Technological Universities
	Moscow Technology Institute
	Moscow Physical Engineering Institute
Czechoslovakia	CVUT, Prague Higher Technical School
	VSB, Ostrava Higher School of Mines
	VSD, Zilina Higher School of Transportation
	Charles University in Prague (human sciences and technology; one of the oldest universities in Europe)
	VSE, Prague Higher School of Economics
	MBA in Celakovice near Prague (the best known foreign school, founded jointly with the University of Pittsburgh, U.S.

Table prepared with the kind collaboration of Marion Woeber and the international network of the H. Neumann agency

Educational Institutions Role

93WS0179C Paris LES ECHOS in French 15 Dec 92 p 17

[Article by Isabelle Mandraud: "A Mine for French Companies; East Europe Training Rush"—first paragraph is LES ECHOS introduction]

[Text] Benefiting from large subsidies, French educational institutions have started many programs in Eastern Europe during the past two years. Companies also participate, hoping to recruit young engineers later on.

While the Germans and even the Italians invest in equipment and production, the French choose to train elites; they hope that the ties thus formed will provide a durable return on their investment. In the past two years, encouraged by the government, French schools and universities have thrown bridges to their eastern European counterparts.

For instance, the Engineers College trains engineers from all of Eastern Europe through a special program named 'Copernic'; the Center for Higher Industrial Studies (CESI) has developed training periods targeting Poland, Russia, and Belorus; the Rennes National Institute of Applied Sciences has developed a curriculum taught in French jointly with the Budapest (Hungary) university (a similar curriculum will soon be offered in Romania); together with other European institutions, it participates in the creation of a pilot faculty in Bulgaria; the Higher School of Civil Engineering (ESTP) organizes many exchanges with Polish, Romanian, Hungarian, and Czech students; HEC [School for Advanced Business Studies] has set up a master's program for engineers in

Poland; and the Lyon Higher School of Commerce is helping create a business school in Saint-Petersburg. We could go on and on.

Projects Pile Up

Since the creation, on 1 July 1990, of the European Tempus program—a smaller version of Erasmus and Comett [Community in Education and Training for Technology] designed for eastern European countries—projects have piled up in Brussels, which finances a large part of all these initiatives.

For its part, the Interministerial Mission for Central and Eastern European Europe (Miceco), created in 1990 at the request of the president of the Republic, has sponsored invitations to 800 grant holders every year, including one-third of engineers, and 6,000 Russian executives who were taught administration and management techniques in France. Under its leadership, training centers were opened in Prague, Sofia, Warsaw, and Bucharest.

"We also promote the development of curriculums taught in French in technical universities, in robotics or electronics to show that French is not just a literary language," Jean-Raymond Masson, the Miceco representative, indicated.

Even French companies joined in this training drive. Under the banner of Brittany's National School of Telecommunications, France Telecom opened a management school in Poznan, Poland, in partnership with Alcatel and Bull. Although it does not have any facility in Eastern Europe, Usinor [Iron and Steel Union of Northern France] nevertheless decided to create the "Gecoops" (European Group for Cooperation in Steel-Making), "a structure designed to aid eastern European countries, to meet the demand for engineer training," Alain Davezac, who is in charge of the program at Usinor, explained.

The Risk of Unprofitability

The first concern of all is to create ties with young people who may end up managing businesses tomorrow. Schools, which increasingly open themselves to international affairs, cannot ignore these countries, as they hope to create interest among businesses. "French groups have asked us to put them in touch with these students, or with universities when universities wish to recruit locally," Regis Vallee, the ESTP director of studies, confirmed.

These generous operations nevertheless run the risk of being unprofitable. Once trained, these young graduates vanish into the landscape when they are not recruited by French companies. "We do not have the means to keep track of all of them," Jean-Raymond Masson acknowledged. As a result, Miceco just redefined it policy and decided to promote training as part of industrial operations, so as to be sure that French companies will be the first to benefit.

For instance, when Thomson set up operations in Poland, Miceco helped train Polish managers. Some 50 applications of this type have already been filed. "All projects are considered as long as they involve a takeover, a buyout, or a joint venture, but our investment never exceeds 50 percent of the training cost," Jean-Raymond Masson indicated.

In doing so, Miceco hopes to attract PMEs [small and medium-size businesses] which, surprisingly, are not represented in these countries. The Copernic program of the Engineers College also wants to attract more small businesses by better targeting the profiles they need and lowering their participation costs (Fr100,000 today). Such a measure is a must as state and Tempus subsidies will not last forever...

French Industry Investments in Eastern Europe Reviewed

Automobiles

93WS0186A Paris INDUSTRIES ET TECHNIQUES in French 4 Dec 92 p 4

[Article by Pascal Lyon: "Valeo Method Learned at Top Speed"; first paragraph is unattributed INDUSTRIES ET TECHNIQUES introduction to related articles (feature title: "Factories Getting Back on their Feet in Eastern Europe")]

[Text] Promising markets, attractive labor costs—the reasons for investing in Eastern Europe are known. But the companies that have taken the plunge have also discovered valuable expertise and industrial plant. For the price of bringing the machinery and organization up to standard and implementing the consequent training plans, buyouts and revitalizations are proving effective.

Since 1 December 1992, Valeo's Reichenbach plant in Saxony has been supplying the clutches for the Astras, Corsas, and Vectras built by Opel at Kaiserslautern and Bochum. These clutches are made in the brand new manufacturing cell at the Reichenbach plant, acquired by Valeo in May 1991 and subsequently revitalized. The managers and administrators are proud of their work. Thanks to their extraordinarily quick reaction time, they have beat the German parts suppliers eyeing this market to the draw.

Valeo Embrayage did not have a single production site in Germany. The opportunity to establish one came with a proposal to take over the clutch division of Renak, a subsidiary of IFA Kombinat, famous for its production of the Trabant and the Wartburg. This meant taking over an old production unit on terms that would satisfy the Treuhandanstalt (the agency in charge of privatizations in former East Germany) and converting it to meet "Western" or, more specifically, Valeo production requirements while at the same time beginning production as soon as possible.

The takeover agreement with the Treuhandanstalt was signed in July 1991. A month later, the Valeo Kupplungen division was created. The race was on. In May 1991 (in other words, before the agreement was signed), Valeo had started producing clutches at the Renak plants and supplying them to Volkswagen (with a B rating). More importantly, it was supposed to be the sole supplier for Vag's future Mosel plant and later on for all the other Vag units in former East Germany.

The takeover brought major staff cuts. Of the old clutch division's 800 employees, only 108 were retained (the plant employs 120 people, six of whom are French). In addition, Valeo initially dropped all of Renak's suppliers because they did not meet western European requirements (they are currently being recertified). It also made a clean sweep of the facilities and materials. The current plant has only 4,800 m^2 of covered space. Although it had just been built by Renak, Valeo chose to refit it almost entirely, keeping only a few presses and lathes. In a word, it started over from scratch.

Production layout and methods were reviewed. The example of disk machining is illustrative of the gap between eastern and western European production techniques. Renak did this machining on a group of lathes connected by transfer machines. Each lathe performed one operation, and changing the settings from one series to the next took four to five hours. These lathes occupied about 100 m^2 and turned out parts at a rate of 30 an hour. Today, two lathes handle all operations and all sizes. They occupy 10 m^2 and work at a pace of about 70 parts an hour (the target is 105). Tool changes take 20 minutes!

Production was initially line-based in order not to disrupt the workers too much. At the same time training began in order to move over to cell-based production. The cultural change was prepared very early on. Beginning in May 1991, German workers were sent for training: a one-month language course to learn basic French, two weeks of training on the products at Amiens, Valeo Embrayage's parent plant, and, lastly, a three-week specialization course for some operators, who were paired with French workers. The training budget represents 4.4 percent of total wages. All of this is aimed at making fast work of instilling and actually implementing the "Valeo production system."

From the appearance of the plant today, the operation seems a success. It is clean and orderly. Performance ratings are posted, and people have been trained for the different stations. Even the employee suggestion system has been implemented and is beginning to produce results. Valeo may be taking advantage of the low wages in Eastern Europe, but not for long! By 1994-95, salary levels in the new Laender should be equal to those in the West. Valeo carried out this 20-million-franc operation in order to gain a presence in Eastern Europe, not to save on wages. Its annual production of 600,000 clutches should quickly climb to 1.2 million.

Electronics

93WS0186B Paris INDUSTRIES ET TECHNIQUES in French 4 Dec 92 pp 48, 49

[Article by Laurence Girard: "Back Up to Western Quality in One Year"]

[Text] In May 1991, when Thomson Consumer Electronics and the Polkolor company signed a joint-venture agreement, production at the Warsaw television tube plant was at a standstill. There was no longer any market for the technologically outdated Polish tubes. A year and a half later, the 1 millionth tube rolled off the new Thomson Polkolor company's assembly line. For TCE [Thomson Consumer Electronics], this Polish operation meets two objectives: breaking into the small-tube market, from which it was glaringly absent, and gaining access to the markets of Eastern Europe.

The margins on the small tubes were very small. However, establishing a presence in Poland had two big advantages. The industrial plant was already in place, which meant that the "entry price" was not exorbitant. Fifty million French francs [Fr] have been invested so far in the Polkolor plant. In comparison, the Anagni plant, which produces the big, movie-format (16:9) tubes, required an investment of Fr500 million for a capacity of 300,000 tubes. In addition, cheap labor represents a minimal part (15 percent) of the cost price of a tube. Although wages are "50 percent higher than in the other Polish companies," according to Bernard Varaut, general manager of Thomson Polkolor, they do not exceed Fr800 a month for most workers.

Despite unacceptable quality levels and an aging production plant, the Polkolor industrial complex had its advantages. First, this is a fully integrated plant. The sand goes in one end and the tubes come out the other. Two ovens operate around the clock, one producing the glass for the tube and the other, the guns. The scanning coils (yokes) are also made on site. All that was needed was to automate the coiling. The screen masks are also an in-house product. Here again, all that was done was to review the equipment in the clean rooms.

Logically, the skills of the workers and technicians covered the entire tube production cycle. Of Thomson Polkolor's 3,000 employees, 2,000 received additional training this year in order to sensitize them to quality problems. Jan Duniec, an Englishman of Polish origin appointed as quality manager, tackled the problem head on. "Production has now achieved a defect level of 0.74 percent and will soon be down to less than 0.5 percent—the average international level in the electronics industry." From then on, it will be possible to export Polkolor tubes to all European markets; the first year's production was sold in Eastern Europe. A second assembly line for 14-inch tubes recently began operation. Next year, it will produce 21-inch tubes. Both the design and manufacture of these tubes are competitive. However, the softening of the consumer market and the slower-than-expected

opening up of markets in Eastern Europe could force the Thomson Polkolor plant to operate at less than capacity.

Software Engineering

93WS0186C Paris INDUSTRIES ET TECHNIQUES in French 4 Dec 92 p 49

[Article by Ridha Loukil: "Actia Discovers Programing Expertise"]

[Text] Atal, Actia's new subsidiary in Czechoslovakia, could very well become the software development center for all of the group's future products. In the process of establishing a presence in the Bohemian town of Tabor, the Toulouse-based manufacturer of automobile electronic diagnostic equipment (100 employees, 1992 sales of 135 million French francs [Fr]) discovered that very high-level expertise was available locally for the programming of microcontrollers and, to a lesser extent, in analog electronics. Today, seven engineers and technicians are developing the application software layer needed to adapt existing products to markets in Czechoslovakia, Hungary, and Poland, the three most promising countries in Eastern Europe for automobile electronics. The most highly qualified among them is paid a mere Fr2,000 a month. Guy Peltier, Actia's general manager, also plans to exploit this mine of cheap brainpower to develop the first software layers of new products, irrespective of the target market. More than a means of access to eastern European markets, Atal is apparently becoming one of the Toulouse-based group's technological pillars.

Unable to find a local company that it could acquire rapidly, Actia put one together out of nothing in two months for a modest industrial investment (Fr4 million over four years). It is betting on sales of Fr3 million the first year and Fr30 million in three years. The current staff of 16 will increase to 30 by 1993. Like a good third of the staff, the three managers (technical, business, and financial) were formerly employed by Jiskra, a Czech supplier of spark plugs and automotive repair equipment. They are contributing their know-how in exchange for a 10-percent stake each in the company. Actia controls the remaining 70 percent.

Actia's move into Czechoslovakia has involved learning a new field: engineering mechanics. In Toulouse, molding, cutting, and so forth are contracted out. However, owing to the absence of competent partners, Atal must start from scratch in this area.

Training remains a concern for Pierre Aubin, Actia's business manager and the general manager of the Czech subsidiary. "Although providing technical training for four engineers in Toulouse was simple, the same is not true with respect to management. For example, it is difficult to introduce costing, a concept that was long non-existent in the country." Actia is working with the Advanced School of Business in Toulouse to set up on-site training in the areas of finance and management.

Germany: Audi Selects Hungarian Site for New Factory

93MI0250 Bonn DIE WELT in German 4 Jan 93 p 14

[Article by Ulrich Friese: "'Audi Will Have Many Followers'—Roland Berger Discusses Germany's Disadvantages for Manufacturers and the Exodus Towards Eastern Europe"]

[Text] Audi's chief planners had three years to look for a site for their new car factory. At the end of November the Hungarian town of Gyor emerged as a clear favorite among over 180 alternatives at home and abroad. Only Eastern Europe, said the Audi strategists, could combine, on a long-term basis, low-cost production facilities with the strategically important access to a lucrative market.

This spectacular move by Volkswagen's southern German subsidiary is by no means unique: In the same way that Audi's competitor BMW has already migrated to an overseas base in the United States and many parts suppliers to other countries, business consultant Roland Berger is sure that: "Audi's example is likely to be followed by many other German firms in other industries."

Berger points to the glaring contrast between "excessive and continually rising labor costs" in Germany and those in central and east European markets, where wage levels are only a tenth as high. Labor costs absorb around a quarter of the sales revenue of major companies achieving western levels of productivity. Berger diagnoses that: "Over half our traditional industries operating on the international market are threatened by cost and quality competition from Asia and Central and Eastern Europe."

Given this background, it is understandable that western German investors are proceeding with caution in these areas, or even, as with Mercedes-Benz's planned truck factory in Ahrensdorf, canceling major projects. According to Berger, "Eastern Germany, with its population of 16 million, does not constitute a large enough market to justify building up extra capacity," especially as the new laender's present payroll cost advantages will inevitably adjust to western German levels, so can hardly be considered an advantage any longer. Investment aid should be used to counter the threat of industrial collapse by exploiting to the full the capital cost advantage that eastern Germany has to offer. "The new laender are attractive locations for capital-intensive factories requiring small labor forces." This points to high-tech or highly automated modern production processes, though some manufacturers had also relocated capacities not meeting these criteria to eastern Germany from the West.

For the time being, economic factors render politicians' calls for the "safeguarding of core industries," unrealistic, says Roland Berger, as "the loss of the new laenders' local and eastern European markets and their

inability to compete in the West means, de facto, that the existence of those industries is no longer justified."

Until they achieve efficiency and competitiveness through restructuring, eastern Germany's "core industries" could, Berger suggests, be included in federal procurement and development aid programs. For example, "Federal funded aid to industry could enable an eastern German machinery manufacturer to re-equip and convert a company in the CIS."

Berger finds it difficult to forecast when this market, maintained by public funding in the form of a protective shield extending over large parts of the eastern German machanical and electrical engineering and chemicals industries, could bring about a stable trading climate with business partners in Eastern Europe. His sober assessment is that: "the new market on Western Europe's doorstep is bedeviled by political chaos and is currently shrinking at a rate of 10 to 20 percent per year."

The economic turnaround in Eastern Europe cannot therefore be expected for at least five to 10 years. However, major multinationals, for reasons of cost and the need to establish a market presence, are finding it essential to move their entire wealth creation processes, from manufacturing to distribution, into the key areas of the world market. "Once again, the Japanese have geographical advantage," comments Berger: Japan has not only the numerous Far Eastern growth markets on its doorstep, but also the massive Chinese market with its 1.2 billion inhabitants. In Berger's view, China's political stability and real growth rates, which have been above 10 percent for years, provide a positive contrast to the relatively late-developing markets in Central and Eastern Europe.

Dutch, Russian Researchers Develop 'Creative' Computer

93BR0358 Rijswijk POLYTECHNISCH WEEKBLAD in Dutch 8 Jan 93 p 9

[Article by Wim Raayen: "'Creativity Can Be Computerized': Twente University Develops a System with Design Capacities Together with Belorussian Laboratory"]

[Excerpts] Creativity is reserved for mankind. A machine cannot be inventive, according to a widely accepted theory. Prof. Dr. Eng. N.J.I. Mars and Dr. P.M. Wognum disagree entirely. According to them, creativity can be reliably computerized. In order to do this a computer must have a great deal of knowledge at its disposal and, even more important, be able to put together this knowledge correctly. Together with a Belorussian laboratory, their faculty at the University of Twente has developed a system which in the future can design products all on its own. [passage omitted]

Despite Skepticism

According to Mars and Wognum of the Information Systems Faculty at the University of Twente, creative computers, despite stubborn skepticism both within and outside the world of computers, are definitely possible. "We cannot prove our point beyond a doubt, but we are convinced that creativity, said by many to be both unfathomable and chaotic, can be systemized, and therefore also computerized," argues Mars.

Wognum believes that creativity is based on the combination of various pieces of knowledge which are already present. "Many psychological investigations have reached the conclusion that an invention or discovery can be traced back to something which that person already knew," she said, "but for unaccountable reasons he failed to make any connection between separate areas of knowledge. If you know that creativity consists in producing something new based on something which is already known, then you can computerize it." According to Mars, it is possible to develop creative behavior in machines on this basis. "You can obtain inventiveness if a computer is able to put together pieces of knowledge which are available to it."

The origin for a greater part of these ideas does not lie with the two researchers themselves, but in the former Soviet Union. For decades the Russian engineer Genrich Altshuller has been analyzing tens of thousands of patents (estimates run from 100,000 to 1.5 million). "He was not looking so much at the inventions themselves, but he was trying to reconstruct their genesis," said Mars. "He has concluded from his research that this process is much more systematic than the developers themselves were often aware of."

Problem Solving Principles

Altshuller went on to develop his "Algorithm of Inventive Problem Solving." This theory assumes that, following in-depth analysis and reformulation, every problem of invention can be brought down to a conflict between two parameters. An improvement in one parameter leads to a worsening of the other. For example, by improving the engine power (desirable), fuel consumption is increased (undesirable). If someone, by combining knowledge, succeeds in getting rid of such a conflict, he invented a creative solution. Using this assumption, Altshuller was able to formulate several constant problem-solving principles.

On the basis of Altshuller's theory, the Belorussian Inventive Machine Laboratory in Minsk has developed a computer program which supplies the experienced designer with appropriate solving principles for the specific problem which he has fed in. The Inventive Machine, as the system is called, is being used in many places in the CIS at the moment, in industry as well as in educational institutes, and according to the laboratory it has already led to a number of new patents. The privatized (!) company has recently set up a sales agency in the United States to market the program there.

Professor Mars illustrated the system's operation using the development of a polishing drum. "The problem here was that the walls of the drum were damaged by the polishing agent. It was therefore necessary to find a wear-resistant lining, the resulting conflict being one between durability and cost. There are enough materials available, such as diamond, but they are unbelievably expensive.

"The Belorussian system presented a creative solution. Cool the equipment to below the freezing point and use ice to coat the walls. To be sure, ice is not particularly wear-resistant, but it is cheap and easy to replace. In the normal way a researcher would not arrive at such an idea, because his thoughts are directed toward hard materials. Using this method he can identify exactly which parameters are present, in this case cost and durability. The program then went on to systematically lead the researcher toward a solution in which durability is less important, because the coating is easily replaceable."

Complementary

Mars came into contact with the Belorussian research purely by accident. "Two years ago I happened to read a report in the newspapers. We then made contact with the laboratory and arranged a visit. Its approach appealed to us very much and our method of working was attractive to them, particularly in the field of knowledge technology. The different types of expertise were very complementary and we therefore decided to work together."

And there is still enough in the system for the Twente faculty to work on. The Belorussian laboratory's program is, according to the University of Twente professor, a good basis but is far from being a fully-fledged creative system. "In order to turn their program into a fully automated design system, structuring of knowledge is necessary. In that area it is still a mess in Minsk."

Polishing Drum

In order to arrive at creative design solutions, such as with the polishing drum, a great deal of technical and physical knowledge is necessary. This requires a high memory and computing capacity. This is not the biggest problem, according to Mars and Wognum. "By interconnecting computers, for instance, you can access information which has been stored in different places. But it is more important that the information be structured in a correct and uniform manner," said Wognum. "And that is where the bottleneck is," said Mars immediately. "The computer must be able to find the right information before it can combine the available information into a creative solution."

Research in the field of knowledge technology costs a great deal of money. Mars: "The Belorussian laboratory had, and still has, no money for the necessary equipment. They have therefore been unable to take the step of feeding in the enormous amount of rightly structured knowledge into the program."

Gradual Improvements

That deficiency makes cooperation with the Twente faculty very fruitful. Twente has sufficient resources as well as the necessary knowledge of expert systems. Wognum: "By pooling our knowledge, we are now gradually improving the Inventive Machine. Particularly for this purpose a Belorussian researcher stayed with us for a while. And he is coming back for a period of four years to study for his Ph.D. degree. In this way we can exchange expertise with each other."

"Within what time scale do we want to reach clear results? That is difficult to assess. During these four years, we hope in any case to have a structure which allows the computer to dig up the proper knowledge for a specific design problem."

For the rest, according to the two University of Twente scientists, the existing Belorussian program is already interesting enough for Dutch designers. The Twente research group is therefore giving courses on the Altshuller theory and is in addition looking for an manufacturer to industrialize the Inventive Machine in the Netherlands.

EUROPE-ASIA RELATIONS

Rhone-Poulenc To Install 15 Factories in China

93WS0135D Paris L'USINE NOUVELLE in French 19 Nov 92 p 32

[Unsigned article: "Rhone-Poulenc: Fifteen Projects in China"]

[Text] Jean-Marc Bruel, new vice president at Rhone-Poulenc, has just signed a cooperation agreement with China (where the group has a turnover of 700 million). At stake is the installation of 15 industrial sites, six of which are already at a very advanced stage of negotiation. All these plants will be formed through joint ventures in which the French group is expected to be the majority partner. They are expected to involve every phase of the group's activities: health, chemical specialties, IOM, fibers and polymers. Cooperation is planned in matters of research, technology and training.

French Auto Equipment Makers Moving Into China

93WS0135E Paris L'USINE NOUVELLE in French 19 Nov 92 p 43

[Article by A.G.-V.: "China: French Equipment Manufacturers Wake Up"]

[Text] Ecia, Sagem, Valeo, and Procal are lining up behind PSA and Volkswagen via joint ventures and licensing.

In 1995, Peugeot will produce 40,000 vehicles in Canton and Citroen will produce 35,000 at Wuhan. By the year

2000, the two French manufacturers may be producing 300,000 vehicles, with a Chinese assimilation rate of 90 percent. To reach this goal, PSA and its local partners are energetically pursuing French equipment makers, as testified by the seminar held on Tuesday, 17 November, at the French Foreign Trade Center, devoted to the opening of the Chinese automobile market. This year, China is in fact the first French automobile market in Asia.

Ecia has granted a license to a Canton company, GHPAP, to make instrument panels and bumpers for Peugeot; production is just starting. Procal, subsidiary of the German company Elring, has set up a joint venture in Chang Chun to manufacture o-ring seals for Citroen and Volkswagen. While only a few agreements have been signed, projects abound: about 20 of them just to supply Peugeot. Sagem Allumage, manufacturer of Wimetal exhaust pipes, and GFI which specializes in screws and bolts, are coming into the game. Valeo Eclairage, Rockwell France (locks, window cranks) and T & N France (engine components) are negotiating to become equipment suppliers for Citroen ZX cars "made in China."

The consensus is that the Chinese partners have obsolete facilities and technology, but that their engineers are very well informed about modern methods. At Rockwell France, the opinion is that "it will take several years before any money is being made, but we will be among the first in place and will be able to benefit from China's gradual opening."

UK-Japanese Partnership Develops Hybrid Digital Phone

93WS0211A Chichester INTERNATIONAL TELECOMMUNICATIONS INTELLIGENCE in English 7 Dec 92 p 3

[Text] A new hybrid digital telephone system which has taken two years to develop is to be launched this month by an Anglo-Japanese partnership. Developed for the European market by Meisei of Japan and applications software company Objective Communications of Oxfordshire, UK, the Meisei MK100D system enables users to run standard PABX and advanced key system telephone hardware on the same lines.

The developers claim the MK100D system is capable of handling over 100 incoming or internal lines for speech and data, features full voice mail integration and can display text messages on handsets.

Objective Communications, part of the Objective Science Group, will distribute the system in the UK, and its sister company Telecom Care will provide maintenance and technical support services.

The Meisei MK100D system was developed with the backing of Japanese trading giant Nichimen.

SGS-Thomson, Hong Kong Firm Enter Into Transputer Venture

93BR0286 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 10 Dec 92 p 3

[Article signed F.G.: "SGS-Thomson Joins a Hong Kong Group To Save Inmos Plant"]

[Text] The Inmos integrated circuit production unit located in Newport, UK, will not be closed after all. SGS-Thomson has just joined forces with the Hong Kong subcontractor QPL International Holdings to create a joint company (30 percent SGS-Thomson, 70 percent QPL) that will be responsible for managing the Duffryn production facility and the Coed Rhedyn test unit. This company, which was named Newport Wafer Fab, will continue to manufacture, as in the past, the graphic integrated circuits and transputers of the Inmos line. The first T9000 transputers will also be manufactured in Newport until their production is transferred to Crolles, when this 200-mm wafer production unit enters into operation. After having initially announced its intention to transfer the production of Inmos circuits to other plants of the group, SGS-Thomson has finally chosen the least perturbing, if not the most economical solution.

The output of Newport Wafer Fab will, however, not be reserved exclusively for SGS-Thomson, although the French-Italian group is a privileged customer and also a partner, since the agreement between the two companies provides for the possible extension of the technology range in the future. According to Li Tung Lok, QPL president, with its new production lines, "QPL will be the first company in the world capable of making a complete offer from silicon smelting, production, testing, and assembling to delivering; this is an extremely promising market niche." QPL thus plans to invest in Newport particularly for upgrading the diffusion lines to process 150-mm-diameter wafers (currently 100 mm) with the financial assistance of the Welsh government. QPL International Holdings assembles the integrated circuits (in particular for SGS-Thomson) and manufactures the housings for integrated circuits. Sales in 1991-1992 exceeded 1 billion Hong Kong dollars (650 million French francs), an increase of 44 percent compared with 1990-1991, with profits amounting to 171 million Hong Kong dollars.

Japanese Components Production in UK Analyzed

93BR0288 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 10 Dec 92 p 6

[Article by Didier Girault: "Japanese Components Profit From Perfidious Albion"]

[Text] The UK, the Japanese bridgehead in Europe for electronics, is the second-largest European components market, representing £2.7 billion, including 60 percent in active and 40 percent in passive components.

Out of 150 Japanese industrial investments in the UK, 40 were in electronic equipment distributed over 29

production sites, according to the report *"Electronic Components: The UK Market,"* edited by the French Foreign Trade Center (CFCE) (to obtain a copy: Service Electronique et Telecommunications, phone 40 73 30 00). In 1991, the Japanese production of electronic components and systems in the UK amounted to £2 billion, i.e., about 12 percent of the UK's total electronics production (£16 billion) in equipment, subsystems, or components. Seventy-five percent of Japanese investments were made during the past eight years.

According to Department of Trade and Industry (DTI) data which were used by the CFCE, a period of four to five years is needed before the Japanese begin to procure locally, i.e., when they switch from the screwdriver plant status to that of full-scale manufacturer.

The French Will Find Opportunities in Market 'Niches'

In practice, Japanese equipment manufacturers procure components mainly in Southeast Asia or from Japanese suppliers which may be located in the UK (NEC, Fujitsu). In 1991, for instance, UK-based Japanese companies obtained more than 60 percent of their requirements from Asian (including Japan) suppliers; this represents some £600 million out of more than £1 billion.

In the CFCE's opinion, local suppliers can exert pressure to try and take markets that have been reserved until now for Japanese production equipment suppliers. Still, according to CFCE, the Japanese are present in strategic sectors: consumer electronics; information systems ($9.95 billion out of a total market of $32.8 billion in 1991) partially due to the Fujitsu purchase of ICL; and automobiles, where a big increase in demand for intelligent power circuits is expected (40 to 50 percent annual growth over the next four years, according to a Bis-Macintosh study). These UK-based Japanese companies procure most standard or common components from Southeast Asian manufacturers, whereas sophisticated products remain the domain of the Americans. European, in particular French, companies can only bank on highly specialist markets or niches.

According to the CFCE data, France ranks between the fifth and seventh positions among foreign suppliers of components, representing 5 percent of British imports of resistors, 4.5 percent of switches, 7.8 percent of capacitors and hybrid circuits, 12.3 percent in monolithic integrated circuits, 19 percent (second place) in relays, and 14.7 percent in thyristors, diacs, and triacs.

The two major UK markets in passive components (£1 billion in 1991) are the markets for printed circuits (£350 million and a British coverage of 44 percent in 1991) and for connectors (£300 million and 80 percent coverage); the main customers of these circuits are the automobile and telecommunications sectors. In integrated circuits (£1 billion in 1991), application-specific circuits (£350 million) are mostly in demand in telecommunications and computer peripherals; for microcontrollers, the main customer is the automobile industry.

Electronic Components Market in the UK in 1991 (in million pounds[1])

	Market	Production	Imports	Exports
Resistors	60	40	70	55
Connectors	330	360	53	80
Printed circuits	350	300	200	144
Capacitors	160	100	144	96
Hybrids	15	60	30	90
Relays	70	30	80	21
Switches	80	70	10	0
Total passive components	**1,065**	**860**	**587**	**486**
Total active components[2]	**1,615**	**1,020**	**2,260**	**1405**

1) One pound sterling = 9.90 French francs 2) Including semiconductors (integrated and discrete circuits), TV color tubes, and valves

With about £1 billion, the UK integrated circuit market is the largest in Europe (it should be noted, however, that companies of British origin with decisionmaking power with regard to component selection and purchases account for only 31 percent of the UK electronic components market, according to a study which is available from Alix Dejore, phone 44 25 34 32).

Korea's Daewoo Creates TV-Tube Plant in France

93BR0313 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 17 Dec 92 p 8

[Article signed F.L.: "Daewoo Launches Attack on the European TV-Tube Market Through the Lorraine Region"]

[Text] The Korean group is going to invest 730 million French francs [Fr] in the establishment of a color TV-tube factory at Longwy. Daewoo aims to produce 800,000 components a year to supply its TV factory, soon to be operational, a few kilometers away, and launch an attack on the European TV-tube market.

The Koreans have decided to do battle on the spot to conquer the European cathode ray tube market. Following Samsung, which took control last October of Werk, a Berlin cathode ray tube manufacturer in which the number-two Korean conglomerate intends to invest Fr500 million over the next five years, it is Daewoo's turn to announce the

establishment of a European TV-tube production unit that should open in 1994. It will be situated at Longwy in the Lorraine, a region where the number-three Korean group (turnover of Fr130 billion, 10 percent of which comes from Daewoo Electronics' electronics activities) already has a microwave oven factory.

A second factory designed for the manufacture of television sets (400,000 a year) is currently under construction; the foundation stone was laid at Fameck on 3 October. Investment in this third site in Lorraine—and fourth site in Europe as a whole (Daewoo manufactures videotape recorders and car radios in Ireland)—will come to Fr730 million. This is enough to set up a production line with, in three years time, a yearly output of 800,000 color TV-tubes with a work force that should reach 610.

The Korean group has received French and European subsidies under a regional development scheme, as well as grants from the Lorraine Region authorities, the Meurthe-et-Moselle department, and the reconversion company of Usinor Sacilor. APEILOR, the Association for the Industrial Expansion of Lorraine which is in charge of the file, does not intend to disclose the amount of the total subsidy granted. It merely states that "the grant comes within the context of current French and European legislation."

Daewoo has a double objective: To supply its Fameck television set factory with 55-cm, 63-cm, and larger television tubes and to launch an attack on the European TV-tube market. According to Pierre Ferre, marketing manager of Daewoo Electronics France, whose 1991 turnover for tubes was Fr450 million, the Longwy factory is expected to ensure the manufacture of masks, deflection systems, and electron guns. Moreover, by 1995, the factory will be equipped with a production line and automatic insertion equipment for producing printed circuit boards needed by the Fameck factory or other factories at the group's sites.

In the world color TV-tube market, estimated in 1991 at a little more than 100 million units (all sizes included), Daewoo is not among major leaders like Philips, Thomson, Toshiba, Hitachi, or Samsung. With a yearly production of 5.4 million color TV-tubes (mostly small size), its Orion subsidiary would be ranked as the world's 12th or 13th supplier. For the time being, it is still not known if the Longwy tubes will be sold under the Orion or Daewoo trademark.

Japanese Semiconductor Users Explain Requirements to EC Suppliers

93BR0315 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 17 Dec 92 p 6

[Article by Didier Girault: "The Europeans Want 5 Percent of the Japanese Market"]

[Text] In Paris, a Japanese electronics procurement delegation explained the miniaturization and SMC [surface-mounted component] requirements of Japanese electronics manufacturers to an audience of European semiconductor designers and producers. It is up to the latter to meet these requirements.

From 7 to 10 December in Paris, [the Japanese] UCOM (Users Committee of Foreign Semiconductors) organized a foreign trade mission with the blessing of MITI (Japanese Ministry of Trade and Industry). Meeting with 52 Japanese procurement officers from 18 companies using electronics components, about 100 representatives of European semiconductor manufacturers established the basis for cooperation which should increase European penetration in Japan. However, both parties admitted that this will take time; Japanese electronics equipment manufacturers indeed consider a long-term strategy as a prerequisite for any cooperation in integrated circuit design.

Considering the Requirements of Japanese Manufacturers

Between 1988, the date when UCOM was created as an offshoot of EIAJ (Electronics Industry Association of Japan), and now, about 3,000 designs have been conducted jointly by Japanese users and non-Japanese semiconductor manufacturers. In the opinion of Nobuo Kanoi, a Sony official and president of the trade mission, "It is vital for European manufacturers to know the requirements of Japanese manufacturers if they wish to make inroads in the Japanese semiconductor market, a market that is open and readily accessible." However, when Karl-Heinz Brinckman, president of the European Electronic Components Manufacturers Association (EECA), stated that "5 percent would be a reasonable share for European manufacturers, considering their share in other world markets," Nobuo Kanoi could not help but feel that this figure was too high.

Japanese electronic equipment manufacturers, in particular consumer electronics manufacturers (40 percent of Japanese semiconductor requirements), need miniaturized products with very low power consumption that are supplied in the form of surface-mountable strips. Sony admits having trouble procuring miniaturized components for walkmen and other small consumer electronics products from European suppliers. Deliveries of European semiconductors could increase once these requirements, as well as quality and deadline standards imposed by Japanese manufacturers, are met. According to the official of the Japanese delegation, European suppliers could play a role in such areas as household appliances, automobiles, telecommunications, as well as in television circuits. Nobuo Konoi stated that Europeans can best access the Japanese market via highly specialist market niches: "There are European companies which manufacture circuits that have not yet been designed in Japan." They remain to be discovered. This was, in part, the work of the Japanese delegation in Paris, which was

able to contact small and medium-sized European companies that cannot afford the luxury of establishing an agency in Japan. Japanese users/designers and European manufacturers—including AMS [Auxiliary Equipment and Hardware], EM Microelectronic-Marin, ES2 [European Silicon Structures], and other small- to medium-sized companies alongside Philips, SGS-Thomson, and Siemens—held some 200 bilateral discussions, which helped initiate agreements. According to Tamotsu Harada, the representative of EIAJ, of which UCOM is an offshoot, this was particularly true since, "It is easier for the Japanese to work with Europeans than with Americans; the latter are more reserved with respect to long-term programs."

[Box]

Share of Foreign Companies in Japan's Semiconductor Market

The share of foreign semiconductors on the Japanese market is 17.9 percent, according to the Japanese Ministry of Industry and Trade, which includes local production in its calculations; and 16 percent, according to the U.S. Department of Foreign Trade. This share still does not reach the 20 percent which should have been achieved by the end of this year according to the United States/Japan treaty of 1986 which was renewed in 1991. The Europeans, who eventually target 5 percent of this market, are currently holding 1 percent (EECA data).

SGS-Thomson Doubles Design Capacity in Japan

93BR0323 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 17 Dec 92 p 11

[Article by Elisabeth Feder: "SGS-Thomson Doubles Its Design Capacity in Japan"]

[Text] Tokyo—SGS-Thomson, in Japan since 1987, is investing in a design center there to increase its sales, which represent only 3 percent of its worldwide turnover.

"In Japan, 40 percent of our annual sales consist of EPROMs [erasable programmable read-only memories], while dedicated circuits sales reach nearly 50 percent." This statement by Keizo Shabata, president of SGS-Thomson Japan for almost a year, now translates into a major extension of the local design center of the French-Italian company. At the end of 1992, the staff will be doubled, and eight persons will be responsible for the famous "design-ins" that are so difficult to "win" in Japan. (Design-ins, also called more explicitly design-wins, are contracts for dedicated circuit design projects that are carried out in conjunction with the Japanese customer and that have to be "won" through competitive bidding.)

Total staff at the Japanese SGS-Thomson subsidiary will thus reach 62, most of them committed to marketing activities. This is a 30-percent increase over the last two years. "The extension of the design center is an investment in the future. It will take one or two years before it produces tangible results. But the moment has been well chosen because our brand image is about to change. Japan is the largest market in the world; we should not be satisfied with a mere 3 percent of the group's sales revenues there," Keizo Shabata clarifies.

"We already have a customer base that has to be developed. And since we are in a position to supply original technologies, for instance in power integrated circuits, we receive many orders from different sectors: telecommunications, automobiles, as well as office systems from printer manufacturers." For example, SGS-Thomson is working on a project with Canon for the development of an ink jet printer. Another project concerns an optical disk reader.

Difficulties of the Japanese Market Have to Be Differentiated

SGS-Thomson Japan's 1991 sales revenues reached ¥7 billion (about 300 million French francs [Fr]) and should exceed ¥8.5 billion (Fr345 million) in 1992, despite the current difficulties of the Japanese market.

According to Keizo Shabata, these difficulties have to be differentiated: "Consumer electronics are in recession, except for audio applications in automobiles. The computer market is in recession, except for office systems and peripherals. The situation in telecommunications is relatively good, and the automobile electronics market is strong as regards export models. And we expect a general pickup by mid-1993."

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